BUILDING The M11/9

A Guide To Construction And Conversion

For the licensed firearms manufacturer,
The serious student of firearms,
and, fun loving citizens everywhere!

Ironwulf Publishing
P. O. Box 1576
Greeneville, Tennessee 37744

AUTHOR'S NOTE:

This work is a no frills, no nonsense, straight forward approach to satisfy the public outcry for the information necessary to understand this weapon system. No time is wasted with history lessons and tales of yore. This is a builder's manual. It has been packaged to meet the demands of the machine shop, though a realistic attempt has been made to give it a place in the sincere survivalist's library. As outside information comes back, updates will be made. All of your comments are welcomed. This must always continue to be a *work in progress* ! Readers are reminded that there are laws and statutes restricting actual construction of weapons. There will be more on this at the end of this 'Author's Note'.

All of the readers familiar with both the MAC 10 & the MAC 11 should be aware
of the similarity of the MAC 11 to the M11/9. Indeed, the M12/380 is the same gun as the MAC 11, although a few changes exist to satisfy BATF that the gun will remain semi only. The M11/9 gets it's name from the conversion of the former model 11, .380 open bolt selective fire gun to 9mm semi-automatic. Thus, the trigger group assemblies of the M11/9 and the M12/380 are identical.
But the semi trigger group and it's pin placement holes differ from the selective fire lower reciever, and there is an obvious two additional inches to the upper and lower receivers of the M11/9. There are also other obvious differences between the guns. In addition to the differences in parts, there is a difference in the safety designs, and the sear stud area of the new semi-auto model has a metal peice welded in which seems to be designed for the sole urpose of denying ease of conversion to full auto. Naturally, the bolt face is larger in diameter than the M11 (M12/380) it evolved from, and the length of the bolt has been extended, presumably for a heavier mass to resist the stronger recoil impulse of 9mm, and perhaps slow the outrageous cyclic rate of the former M11, which for sake of clarity shall be referred to in the rest of this text as the M12/380, as that specifically describes the semi-auto .380. It is important to note that even the sales people at the popular outlets get confused and upset by the problems in these new names. So,

for a better picture, it is important to know that the first three Ingram guns produced at the Military Armament Corporation were the Model 10 (MAC-10) in both 9mm and .45 caliber. These guns were the same size and varied only in the magazine housings and of course the obvious barrel, barrel threads, and bolt face. The third gun was the much smaller Model 11, and it was a .380 auto cartridge firing weapon. All of these guns fired from the open bolt. The barrel threads of each were standarized like this:

MAC-10 .45 Caliber : 7/8" N.C.
MAC-10 9mm : 3/4" N.C.
MAC-11 .380 Auto : 5/8" N.C.

The M11/9 selective fire weapon uses the M11 open bolt trigger group parts set. A selective fire lower built for the M12/380 IS a Model 11! There is no M12/380 SMG. To build a select-fire M11/9 or change the M12/380 to a select-fire weapon, order the M11 SMG or open bolt parts sets. The same parts sets fits both guns. But the builder is advised to also purchase a "weld pack" kit that includes the magazine housing, sear stud, front tabs, trigger guard, and other parts of the full auto frame. You see, conversion of an existing semi-auto to full-auto is possible, but the safety assembly must be removed, leaving two 1/4" holes that are unusable, and the bent metal piece in the front must be cut out to put in the parts. A separate lower reciever construction is a bit more work, but is advised rather than hacking up the original semi-auto. Nonetheless, the conversion will be detailed in this book.

Readers enthusiastic about MAC history are directed to read Nolan Wilson's book, "The MAC Cookbook", and the Vol. III issue of the "Full Auto" series; 'The Ingram'. The "MAC Submachine Gun Operating Manual, Volume 2" details maintenance and operation thoroughly, including the stock assembly. Since this book is deticated to the construction of both of the the M11/9 guns, coverage of the stock and safety assembly of the SMG is included.

Far be it from the minds of liberal legislators to comprehend the

vast differences between closed bolt - semiauto only, and an open bolt firing selective fire weapon. It is no simple procedure to modify any closed bolt weapon to remain closed bolt and function full auto. This does not apply to the military weapons originally designed to function selective fire from the closed bolt. As much as it may appear so, the M11/9 semiauto is *not* one of them.

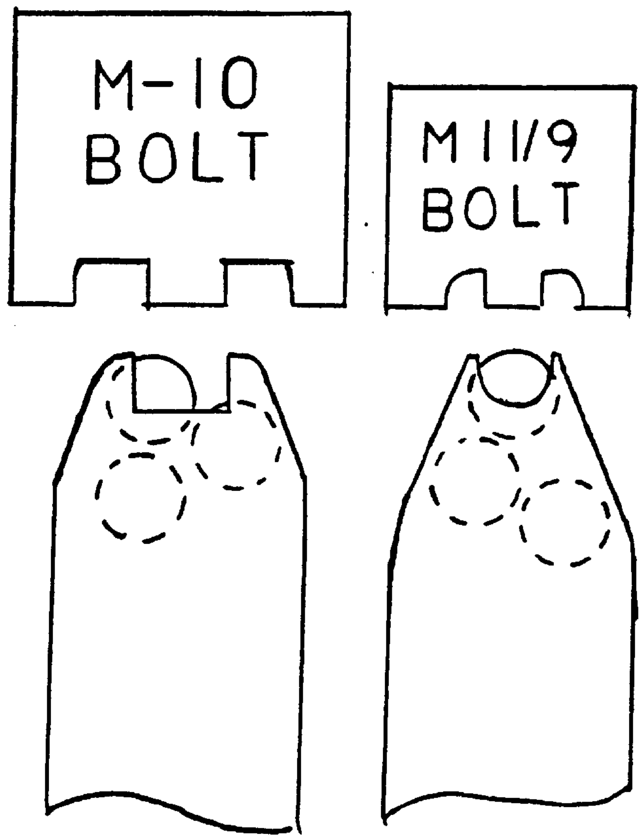
Rather than pursue the study of developing a selective fire, closed bolt gun, the development of the M11/9 open bolt SMG and the information necessary to
build the M11/9 (AND - M12/380) in the open bolt as they were designed is being disclosed. It is the author's opinion that the cyclic rate of the MAC 11 (M12/380) has been understated, and the feeling is that there is ample reason for the sparse availability of the 30 round magazines. Having owned a couple of MAC 11's as a licensed machine-gun dealer, one - a Military Armament Corporation gun, and the other an RPB, experience with the high cyclic rate is assured! This experience includes failure-to-feed due to the magazine not being capable of keeping up with the cyclic demand. While this is not true of all of the magazines produced, it may be necessary to buy a number of the metal magazines to 'cull out' the slow ones. Experience with the selective fire M11/9 is also exhilerating! The new glass filled 'zytel' nylon plastic magazines have shown mixed results in the M11/9. Some hold up for as many as 500 rounds, but with a cyclic rate so close to the cyclic rate of the M11, the heat of friction alone works on the lips as fast as the heat of the gas from the expended rounds. The best advise from here is to invest in the metal mags and either hand make the extended mag release shown later on, or buy the factory metal mag catch. The weakest link in all auto weapons systems - semi and full - is the magazines. Please be advised that at this time of writing a great many opportunists are selling a number of varieties of magazines that supposedly are just the ticket for the M11/9. Very few actually work well in the gun. Meanwhile, as we wait out the politicians, the prices are going nuts! When you contact anyone selling M11/9 magazines, it would be well to ask if these are the magazines made SPECIFICALLY for the M11/9. (SWD, Cobray. RPB, or CMP) For the information enthusiasts out there, the two

MAC 10's were originally built around:

9mm : the Walther MPK & MPL magazines
45 Cal : the M-3 greasegun magazine

It is important to understand that the M11/9 mags and the M10 9mm mags are *not* the same magazine. The lips on the M11/9 are different from the M10, which had a larger bolt and feed lip. Any attempt to use the M10 mags in the M11/9 will be a dismal failure. See the illustration on page 4.

A good many communications were made, and time spent in searching out the riddle of what magazine the original .380 Auto MAC-11 was built around. The very helpful people to the author included Russell Weeks of RPB, whose experience and advise has been priceless, and he attests that originally the M11 was built around the STEN gun magazine. Other responses suggest that MAC developed the existing mag. At any rate, now that this is in print, perhaps more input will make itself available. The good folks at Component Metal Products (CMP) who were so helpful during the original drafting of this book, now produce the only known 30 round magazines for the M11 - M12/380. Their sales number appears in the back under the listing 'R & R Distributing'.



THIS ILLUSTRATION SHOWS WHY THE MAGS WILL NOT INTERCHANGE.

It is safe to say that no major problems in the RPB 9mm Model 10s were experienced due to the magazine, though experienced, dedicated users generally agree that the desired dependability can be 'enhanced' by polishing the inside walls of the magazine and carefully stoning or filing any burrs from the lips (historically, the most troublesome part of the magazine). This has solved most problems with the .380 mags. CMP in Atlanta, who have made the RPB magazines so long suggest that the main problem is the follower construction. The wizard there Jerry Richardson, can answer any questions you may have with magazines.

Problems experienced with the .45 caliber model 10 are seldom related to the

magazines. Both the M-3 magazine and the Walther mags were designed for rowdy military applications, and are built to take it.

In the event that some less experienced individuals become confused, it is intended that all terms used be understood. In the third generation re-write the decision was made to eliminate the majority of the technical terms, as it had been written in part in the government intellligence report. Let's begin with that term, "open bolt":

A friend had his Uzi converted to selective fire, which means that the gun now is a machine-gun and the sear no longer holds the striker assembly when the bolt closes on a chambered round. That striker assembly is now a fixed part of the bolt itself, as the bolt was originally produced as a part of the machine-gun. So, when he cocked the piece to try out his new found joy, he came by a bit angry (he paid a pretty penny in gunsmith fees and licensing) with the complaint that the gun was "broken"! He was shown that the gun now remained with the bolt in the open position upon cocking and was released from that position by pulling the trigger. There is a 'lurch' forward with open bolt guns that must be anticipated and controlled that for the most part, does not exist with guns firing from the closed bolt. For the reason that this encounter does not lend the gun to precise single shot accuracy, more than one company or individual has built the MAC in "Full Auto Only" models.

This brings up another popular term: "blow back":

This term *generally* is used most to describe open bolt sub-machine guns (and, the SAP Ingram outlawed in the eighties.), but it is not limited to these weapons. The term "blow back" is a description of a recoil action. It means that the recoil action depends on the gases from the fired cartridge to move the bolt to the rear, cycling the weapon for the next shot. It does not describe a semi or fully automatic mode and it does not describe only the open bolt operation. When the gas is channelled through a port in the barrel, into a cylinder to drive a piston that in turn moves the operating rod assembly that unlocks and retracts the bolt that chambered the cartridge, it is a "gas

operated" system. The closed bolt semi-automatic M11/9 is a "blow back" weapon. For the curious, all of the following guns had their origins as "blow back", open bolt sub-machine guns and were modified to sell to the general

public as closed bolt firing 'pistols': The M11/9 Semi
All models of the Uzi
The Tec-9 (Varient of the KG-9)
The MP-9
The Stirling (Lancaster, & STEN)

And there are a host of others too numerous to list.
The Colt AR-15. and M-16 rifles and carbines in 9mm are "blow back" functioned weapon systems. In .223 (5.56mm NATO), this system is gas operated. The .30 Cal, M1 Carbine is one of the bastards, as it is gas unlocking, recoil (blow back) operated. The Heckler & Koch rifle, carbine, and pistol systems are roller locking, and while they are "blow back", it is a sophistocation called "retarded" blow back. Most interesting because it lends itself to the lower powered pistol cartridge and the Mg-42 and CETME MG-82 belt fed, full-sized, rifle cartridges.

Some enthusiasts refer to recoil operated as "slam fire" weapons.

All MAC weapons (10, 11, 11/9, etc.) handle best with something up front to hang onto. Another book covering a couple of suppressors designed with the standard threads of the MAC, the M11/9 & the M12/380 guns specifically in mind, is available from the publishers of this book. Also, soon available is the book for the inevitable apocalypse depicted in 'The Turner Diaries'; that being, 'The MAC, From Scratch!' This book is being written for all those die hard enthusiasts with time and motivation (and maybe a small machine shop in the garage) to make the whole thing part by part themselves. Think of it as an introduction to machine tooling, and jump right in! Part by part it is not so difficult. Just remember that every complicated thing is built from several simple steps, and take it one step at a time! Stock up on magazines - the heart of all auto weapons systems - at every opportunity your cash will allow, and in view of pending legislation, ammo!

Another book in the works details the construction of a few of the 'periphery' or after-market products available for the Ingram guns, such as; the operational briefcase outlawed by BATF as "an assassination devise", the holster for the M11 and M11/9,

with holder for the suppressor and extra magazines, a few of the cute little front end attachments designed for better control, and a bizarre scheme (Shades of 'Mad Max'!) for attachment of the gun "Under the hood, and through the grill, to anyone's house we go!" for fun and information only.

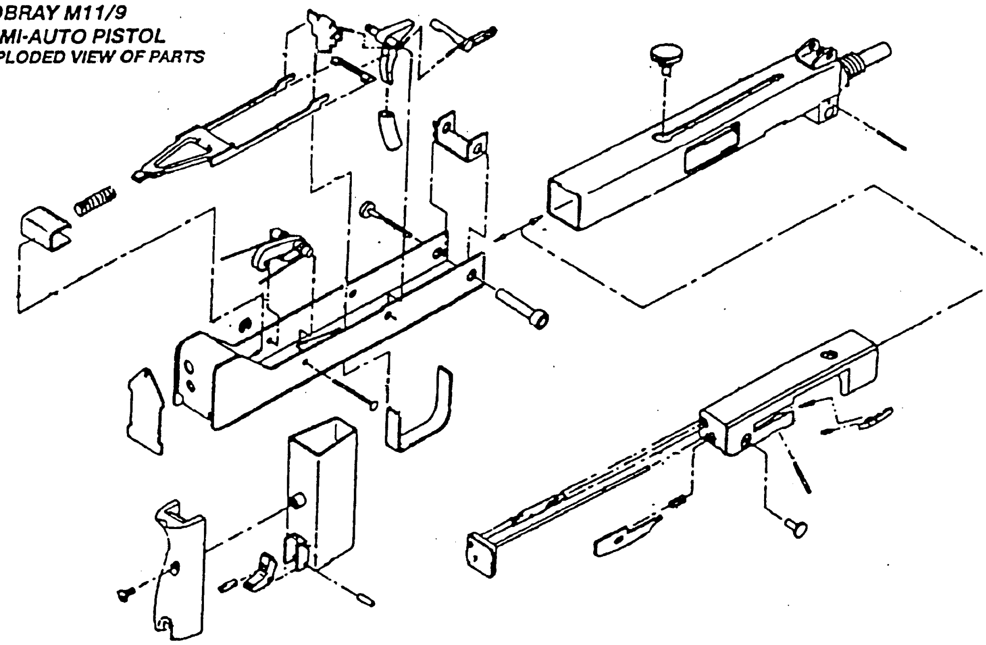
In this country, and as dependably stable as our government is, it is foolish to suggest that civil strife is on the horizon, however, there are those with that concern in other parts of the world. The citizens of Lebanon, and Israel, for example, had no access to finished state of the art weapons, and the talent to develop and build their own, magazines and all, has given us some fine hardware and a lot of fun. The study of building from scratch is a wonderful way to know the miracle of machines and the capability of your own imagination. In this experience, you are one with the oppressed struggle of freedom fighters everywhere, only you are in the relative safety of your urban home! Of course, you are now and always advised to check with local and federal authorities before engaging anything like gun building, even if it is a dummy, non-gun. This book and all of the books mentioned were written with the express intent to educate the enthusiasts and the curious. It is further hoped that this book may be of value to the novice licensed manufacturer and interested members of law enforcement. One can also best repair and tune existing guns if they first understand function and construction. If our politicians knew the real population of enthusiasts in this area, the legislation would would be vastly different! In view of the simplicity of most subguns, it makes one wonder about the mentality of those who propose to restrict the existence of these guns with legislation.

Nonetheless, be advised that construction of an open bolt firing weapon has been illegal since 1986. Construction of an automatic weapon (machine-gun) requires a manufacturing license through the treasury department bureau of Alcohol, Tobacco, and Firearms (BATF). Please understand that these people take their work very seriously and have no sense of humor. New provisions of the 1986 modification to the 1968 Gun Control Act say, simply put - "No new machine-guns." It may as well be noted that modification of a legal semi-auto M11/9 to

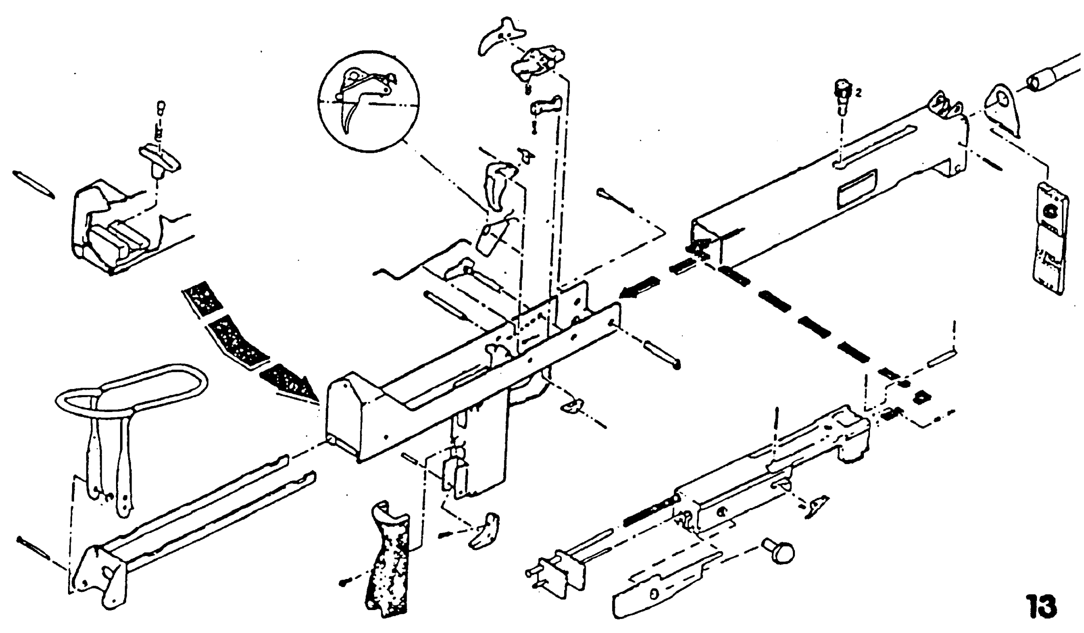
selective-fire status also voids the factory lifetime warranty.

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COBRAY M11/9 SEMI-AUTO PISTOL
EXPLODED VIEW OF PARTS



M-11/9mm – M10 – M11



BUILDING THE M11/9 (AND M12/380)

Looking at an M11/9 parts kit (or M12/380) from MAC, RPB, or Cobray, via their
ad in someplace like the Shotgun News, you are looking at a pile of parts to build a semi-auto, closed bolt pistol. If you do not have an 'exploded' view of the parts as a guide, one is printed on page 13 of this book. The blueprints for the lower receiver and the frame flat are on a large laminated sheet, folded in the binder pocket. They have detailed sectionals for various areas of interest front and back. Also, in the binder pocket is another large laminated sheet for the layout of the sectioning of the square tubing covered in chapter one. On the back of it is the trigger group holes layout for the M11/9 semi-auto model. Also in the binder pockets are the laminated prints detailing the forming die specifications, and the tool room charts for your reference and conversion of fractions , decimals, sheet metal gages, and tap drilling.

If your interest is in the construction of the selective fire model, it will be necessary to obtain a few parts yet, available from RPB and vendors at gunshows. At the time of writing (Approximately Summer,94) a complete trigger group parts set from RPB (address in the back of this book) is $49.95 including shipping for the M11. It is a deal at that price, since the price is not retail; $60-75 is more common and that price will go wild if any of the pending legislation passes. Right now, the wiser amongst us are buying up any and all they can afford and putting it away. RPB offers an openbolt trigger group at about nine dollars more that includes their replacable firing pin, called the M11/9 SMG trigger group.

Since welding is required anyway, either the stamped firing pin in the kit may be welded in place or one may be made from 3/32" wire, with a radius ground on the nose. Consider that the full auto firing pin costs $13, and an old ejector pin from a plastics mold is free. In this case, something a bit more durable than a piece of welding rod should be used. Oil hardening ground stock, music wire, or an old plastic injection mold ejector pin is commonly sucessful. The worn firing pin' story about open bolt

subguns, is for the most part, a myth. Practically all open bolt guns have a 'fixed' firing pin; which means; formed as a part of the bolt when the bolt face is machined. WW II Sten gun parts kits are still abundant, and who knows how many tens of thousands of rounds have been run through them before they found their way into the hands of loving enthusiasts. The barrels of such guns are, on the other hand, scrap metal!

There is one consideration that may find an application for having both of the two firing pins available: The modified bolt will function in the original semi-auto frame if a second separate lower reciever is constructed. Obviously, there will be a great surprise in store for any individual loading a magazine in a semi-auto model with a fixed firing pin! This can be real hard on coffee tables and friends! In the old days of playing with the model 10 'MAC', it was not uncommon to construct a second lower reciever to play, leaving the orginal semi unit untouched and legal. But - these guns had the same trigger group parts, and since both fired from the open bolt, both had fixed firing pins. See the photo number 1 which compares the M11/9 SMG lower to the semi-auto lower. The control designs are quite different. At any rate, the construction of the fixed firing will be covered in detail later.

BE WARNED

IF YOU LOAD A FULL MAGAZINE INTO A SEMI-AUTO M11/9 FITTED WITH A FULL AUTO FIRING PIN, AND PULL THE BOLT TO THE REAR, THE WEAPON WILL FIRE WHEN THE COCKING KNOB IS RELEASED! IT WILL CONTINUE TO FIRE UNTIL THE MAGAZINE IS EMPTY - ABOUT ONE AND ONE EIGHTH OF ONE SECOND!

THIS IS NOT A SAFE PRACTICE.

If the builder has purchased an M-11/9 semi-auto kit with the intention of constructing a select-fire weapon, an SMG trigger group kit will be necessary as well, and some separation of parts will be necessary as most of what is in the M11/9 Semi kit will not be used. Identification of parts will be covered in the "Assembly and Fitting" chapter number 5.

Naturally, a life's dedication to the machine skills trade and an elaborate shop available to you makes this work quite simple, but this is a study in survival level simplicity, and the intent is to learn the possibility of construction in a less well prepared environment: like the urban garage! Let's begin then by reviewing the minimum tools required to do a *decent* job:

****A six or eight inch dial vernier caliper (This is a MUST!)**
*** A bench-mounted 4" or 6" vise**
+ Or, a carpenter's 'Bar Clamp' or drilling vise. (Must open 5 inches)
*** A 3/8ths electric drill (Preferably variaspeed-reversable)**
+ A bench or floor-mounted drill press would be better.
*** An electric 'Mototool' or air-powered die grinder**
*** A set of fractional drill bits, 1/16 to 1/2 (standard fractional index)**
+ For sake of economics, only the drills required need be purchased.
*** Four basic fine to medium cut files:**
+ One eight to ten inch flat mill bastard
+ One small diamond shaped 'needle' file (Also called a 'riffler')
(Or, a small fine cut, thin flat file that cuts only on the edge.)
+ One 1/4 inch round chain saw file
+ One 1/8 inch fine cut round file
*** A selection of excellent condition 'C' clamps: 2", 3", & 6" or 8"**
+ It is essential that any 'C' clamps used be undamaged. Alignment and square of the gun's frame will only be made more difficult with a bent 'C' clamp.
*** A combination square**
*** A pointed metal scriber (Can be made from any small diameter steel rod)**
*** Machinists layout blue dye, or a dark (black or dark blue) spray paint and the necessary solvent to remove whatever is used.**
*** A forming block to fold the sheet metal flat into a 'U'**

+ The difficulty here is that the inside dimension, left to right, is not an industry standard. More than likely, it will be necessary to enlist the aid of a machine shop to have this made. An industrious person with a body grinder may attempt to grind and measure repeatedly until the size is achieved, finishing on something like a belt sander, but please bear in mind that sqareness is critical. There will be much more discussion later, including construction of a forming die, and construction from light gage square tubing by 'sectioning' and welding.

*** A hack saw with metal cutting blade or power band saw. A power jig saw or power scroll saw with appropriate metal cutting blade may be used.**
*** A light hammer (Like an eight to ten ounce ball peen)**
*** A pair of needle nosed pliers**
*** A decent condition (good point) center punch**
*** Access to an arc welder, preferably heli-arc TIG**
*** Metal finishing compound(s), such as, parkerizing solutions or paint.**
*** Some emery cloth or paper in the area of 120 to 240 grit**

Other optional tools will be mentioned in the description of the areas where they could be used. Some of these, like the pin punches, can be handmade or improvised.

Most importantly, it is critical to be PATIENT! Before any attempt is made at construction: READ THE INSTRUCTIONS! This is especially important to the novice manufacturer. The experienced don't need the directions in this book, just the blueprints.

The major stage in this project is the forming of the lower receiver shape itself. Placing of the trigger group holes is critical, but only requires patience and familiarization with the dimensions and the directions before attempting to place them. This will be discussed in the 'Trigger Group' chapter 2 later on.

Considering the forming from a 'flat' supplied by Cobray, MAC, or RPB, there may be some difference in thicknesses between

them. They should be between 070" and .082". This only needs consideration if used with the simple forming die explained herein. The manufacturing tolerances of sheet metal in this country are quite liberal. Studying quite a number of the commercially supplied flats, it is impossible to say whether 14 or 15 gauge was the intended standard. Either will work though, with acceptable satisfaction.

Please understand that holding dimensions close in machine work is akin to a city counsel asking for money in taxes. Always expect more than you will get. The ideal to shoot for is getting all dimensions 'dead nuts'! Realistically, dimensions can vary a little, but this isn't carpentry! In a few cases .020" is tolerable. In others, more than .010" will cause problems. If you think this is exaggerated, consider that the manufacturing standards were probably plus or minus .003" in the trigger group holes and inside width of frame wasn't more than plus or minus .010". Length of the frame is where the tolerances are. Placement of the trigger guard is next in importance, and then, squareness and position of the magazine well. The reason for good 'C' clamps is that things tend to warp and move when subjected to the intense heat of welding. It is these clamps that will be depended on to keep the components where they were put at that time. It is why TIG (Heli-arc) arc welding is the process of choice.

It's forming time!

CHAPTER ONE
FORMING THE FRAME CHANNEL

Since this is a 'survival level' education, instruction begins with a piece of cold rolled sheet metal (preferably 14 or 15 gauge) twelve inches long by six inches wide. It should be sanded clean to the metal (remove all rust and scale) and the long edge squared precisely to one end. The long edge should be checked with the straight edge rule of the combination square. This can be filed, ground, or sheared, but must be true. Study the BASIC FLAT print for proper dimensioning.

In the event that builder interest will begin manufacturing from a 'flat', the following can be skipped. Proceed to the folding instructions and begin.

Next, the metal is coated with layout dye, a light coat of dark spray paint, or a magic marker. Then, measured across the width halfway. A clear line is scribed down the full length of the piece. This is the reference "Zero". Looking at the flat print on the large laminated sheet, the outside dimensions are transferred as shown to the metal and anything outside those lines is cut away. Or, using some spray adhesive like the 3M, Elmer's, or one of many other products available, stick a photocopy of the print shown to the metal. Use great care punching in the two hole centers. Or, (the best way) even though they are before you on the paper, punch in one hole and measure in the other. If the forming die will be built and used, the flat can be used to determine the holes in the die, or the other way around.

Making this flat by hand, the cutting is done outside the lines at least 1/32 (.030") and ground in using a hand grinder, files, bench grinder, or (the favorite) a belt sander with a medium grit belt, mounted belt up in the bench
vise. Dimensions are always double checked throughout each step. *Everything* is ALWAYS double checked! The radii at the narrow base of the 45 degree slants extending outward can be shaped with the Mototool or the round files. The relief work in the base of the 'tail' piece tab (that will later be folded twice) will

surely have to be filed in after most metal removal is done by drilling as indicated. More than one 'flat' is always made, as no one is perfect, and it is much easier to remove metal than to put it back on! Historically, this has proven to make work more exacting, but on occasion, it can create more error! The relief under the ejection port on the right side can be cut in *after forming*, as it will reduce the frustration of error in the forming process.

Squareness of the 'tail' piece tab is rigidly controlled from the front narrow edge, the parallel outside edges, and the backs of the sides of the frame. Experience has shown that alignment of this tab is very important, and this must be stressed. Correction of errors can be made during forming, but if square and alignment are carefully observed, it will not be necessary. The width of the tab being slightly undersized will cause no problem. However, being oversized is an important concern. The 'BASIC FLAT' sketch is used for reference.

No holes for the trigger group can be placed dependably until a study of the folded channel is made after the folds. However, the holes in the 'tail' piece tab for the recoil spring guide and ejector rod are not dimensionally demanding, since they just keep the rods in the general area to reduce binding. (Compare a rod head to the hole diameter.) Nonetheless, a major effort is made to keep everything 'dead nuts', remember? If the sear stud hole and the front stock mounting hole from the print are transferred using the print directly (such as, pasting it to the metal) importance is placed on being as exacting as possible. In the event that the 'Die Forming' method is used to fold the flat, transference of the sear stud hole from the flat to the die forming core block after the front stock mounting hole is drilled in is usually the quickest and most exact method employed. Even if the stock kit will not be used (It is of little practical value, but looks 'cool') the front stock mounting hole must be placed as these holes and their pins will locate the flat for forming.

In making several flats at one time, several 'blanks' of the dimensions given are stacked upon one another, carefully squared to each other, and a bead of weld is run across the

layers at the center of the widths at each end. Any protruding weld top and bottom is cleaned off, and the top flat is laid out as previously described. (It is practically impossible to do a decent job cutting the flats thus stacked and welded without a band saw.) The last dimensions cut loose are the ends since there can be a little slop in these without harming the finish product. It is, however, best to first drill the locating holes and the tab holes in this welded assembly. If the stock kit is to be installed, those areas for clearance must be removed around the base of the tab and all three of the stock mounting holes drilled. An experienced machinist could also remove the metal in the areas for the magazine well and trigger slot, carefully notching in the dimension for the trigger guard. These must, however, be as perfectly centered as possible to the center line of the locator holes. And it is suggested that the trigger guard notch at least, be finished one at a time, and not in assembly. In the event this is done, more concern must be given to the dimension from the front of frame to the mag well area dimensions. Since there are a couple of ways to approach forming, let's return to that after discussion of an alternative.

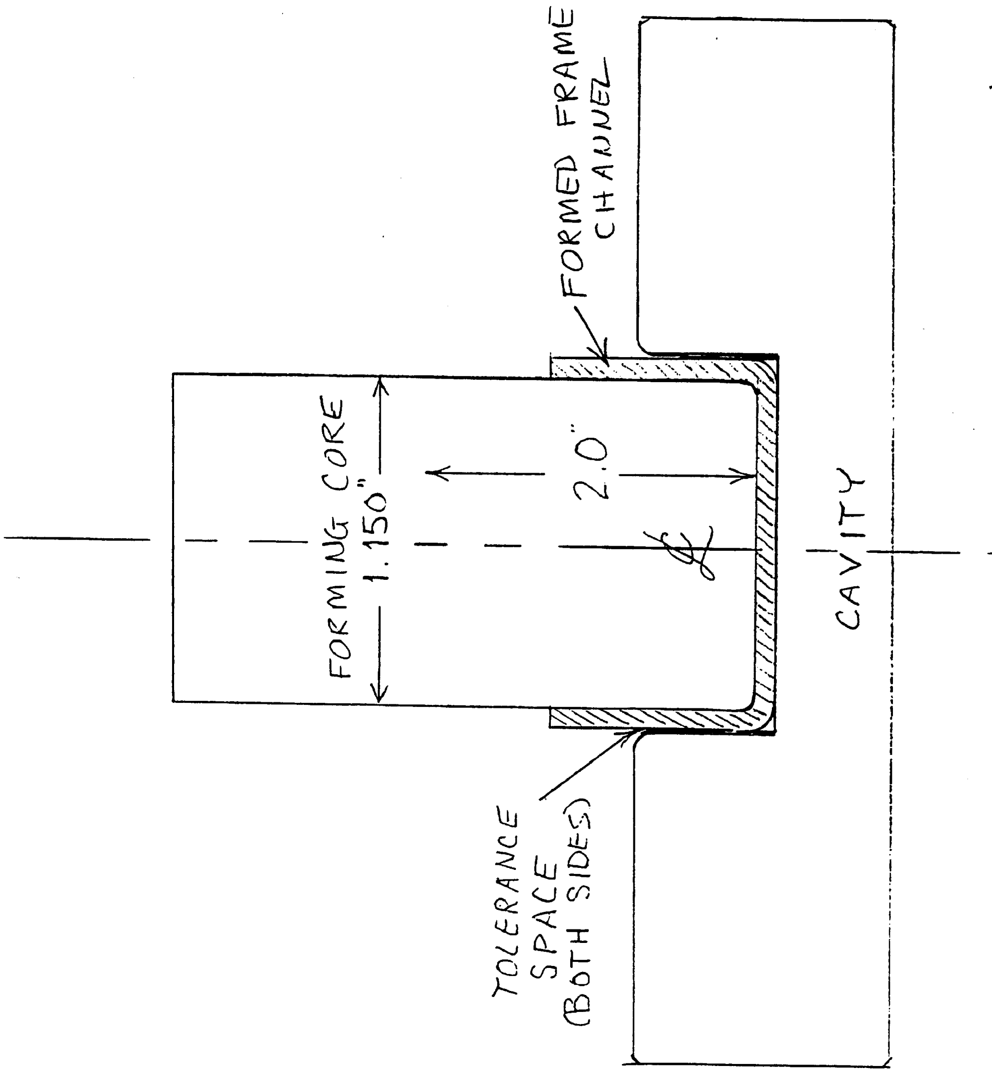
Bending without a die can be difficult but con't give up just yet. Something must be devised to impress the gunsmiths of Peshawar, whose primitive efforts astound the modern machine world yet! There are several options to choose from. The first is not to bend at all, but to use a piece of 14 gauge square tubing from a metal supplier or junk yard. The actual gauge used by Cobray appears to be 15 gauge (.075). It must be at least 13 inches long, and a minimum of 2" by 1 1/4". Remember, these are outside dimensions. Most likely, however, only 2" by 2" will be much in supply. Larger can be used and really won't be more work, but it will change the math that is already done for you. An extremely fortunate individual may find a piece of 1 1/8th" by 2" I.D. Thus doing, all problems are over! This is ideal because only the critical areas inside the tubing need to be cleared .012 - .013" on each side. Numerous calls were made to several metal suppliers, and all agreed that 1 1/8th" by 2" is considered an industry standard, but it is not being produced at this time.

Work is begun with this piece of tubing (Assuming 2" by 2"), and

using the combination square or a dependable machinist's square both ends are made square to a length of 11 1/2" by grinding, filing or milling. Inspect the tubing carefully, as most of it is made with a seam. This seam is kept up, in the scrap to be cut away. Now carefully study the square tubing 'SECTIONING' drawing. Then, at 2 1/4" from one end, a cut is made down and square to the top of the inside bottom. BOTTOM SURFACE MUST NOT BE CUT! The open end of the tubing is turned up and clamped in a vise with the cut end up. The three sided section is carefully cut away leaving a piece of square tubing with a tab protruding. Burrs are filed away inside and out, and along the outside edges of the tab.

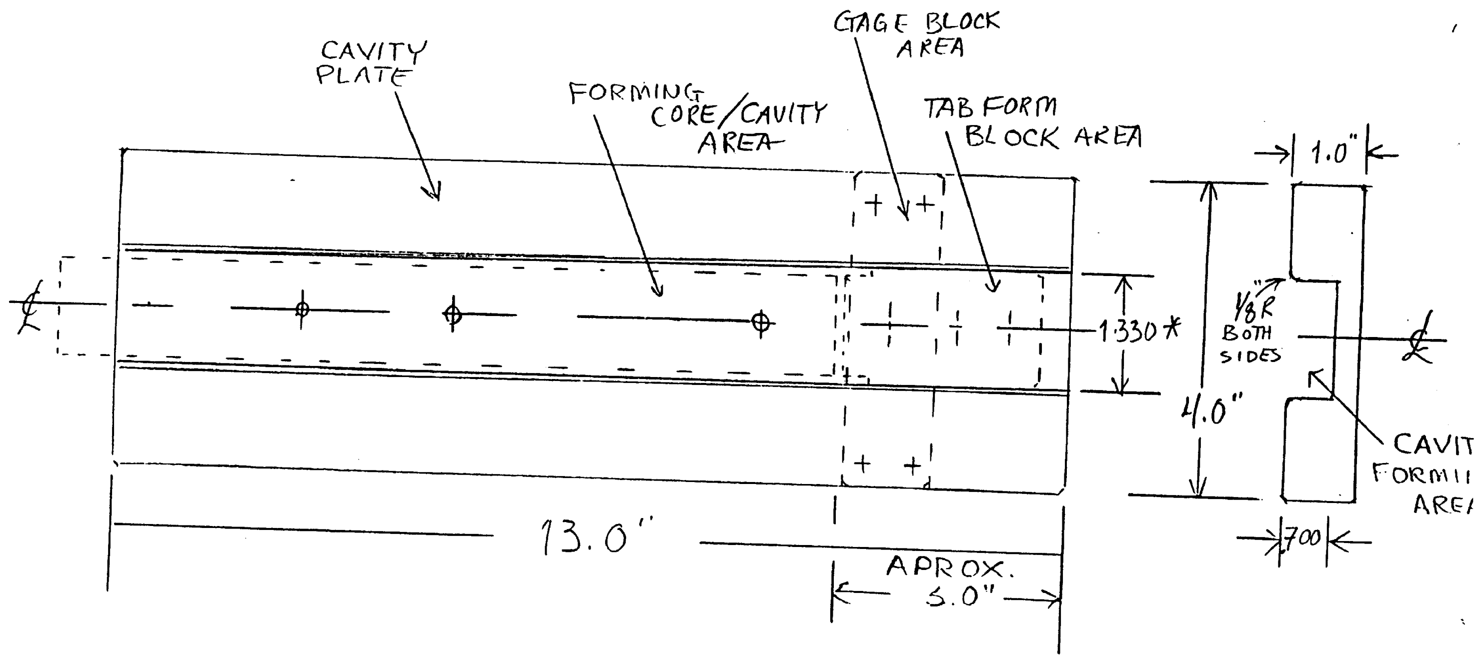
The 'bottom' of the tubing is the surface with the tab that was just cut. The 'front' shall be the end opposite the tab end. The length of the extending tab is double checked to print dimension. A measurement is made up each side from the outside bottom .930", and a line scribed forward the entire length of the uncut tube on each side. Then, from the rear, measure forward .900" at the top and draw a line *vertically* on each side. DO NOT CUT THE VERTICAL LINE. It is just for reference. The bottom of the tubing is set on a good flat surface, and using the 45 degree angle of the combination square head, a line is scribed from the junction just drawn at the top on each side, downward and forward at a 45 degree angle to the junction of the .930" line up from the bottom.

Now, the front square edge of the tubing is cut down the .930" lines on each side near the bottom. Care is taken to cut only *to the line* that intersects at 45 degrees. Both sides are cut leaving the scribed line visible. Then, the 45 degree lines on both sides are cut down through the top to the junction where the bottom parallel cuts were just made. All that is left now, is cutting away the remaining center piece at the top rear. Cut just the metal in the center, and none of the sides yet. Clean up the roughness and burrs inside the tube. Then, using a grinder, file, or belt sander, bring the rear heighth of the sides to 1.940", and deburr this work. At this point, the work done should look like the SIDE VIEW in the drawing.


FORMED FRAME CHANNEL
FORMING CORE
1.150"
2.0"
CAVITY
TOLERANCE SPACE (BOTH SIDES)

DRAWING NO. 1

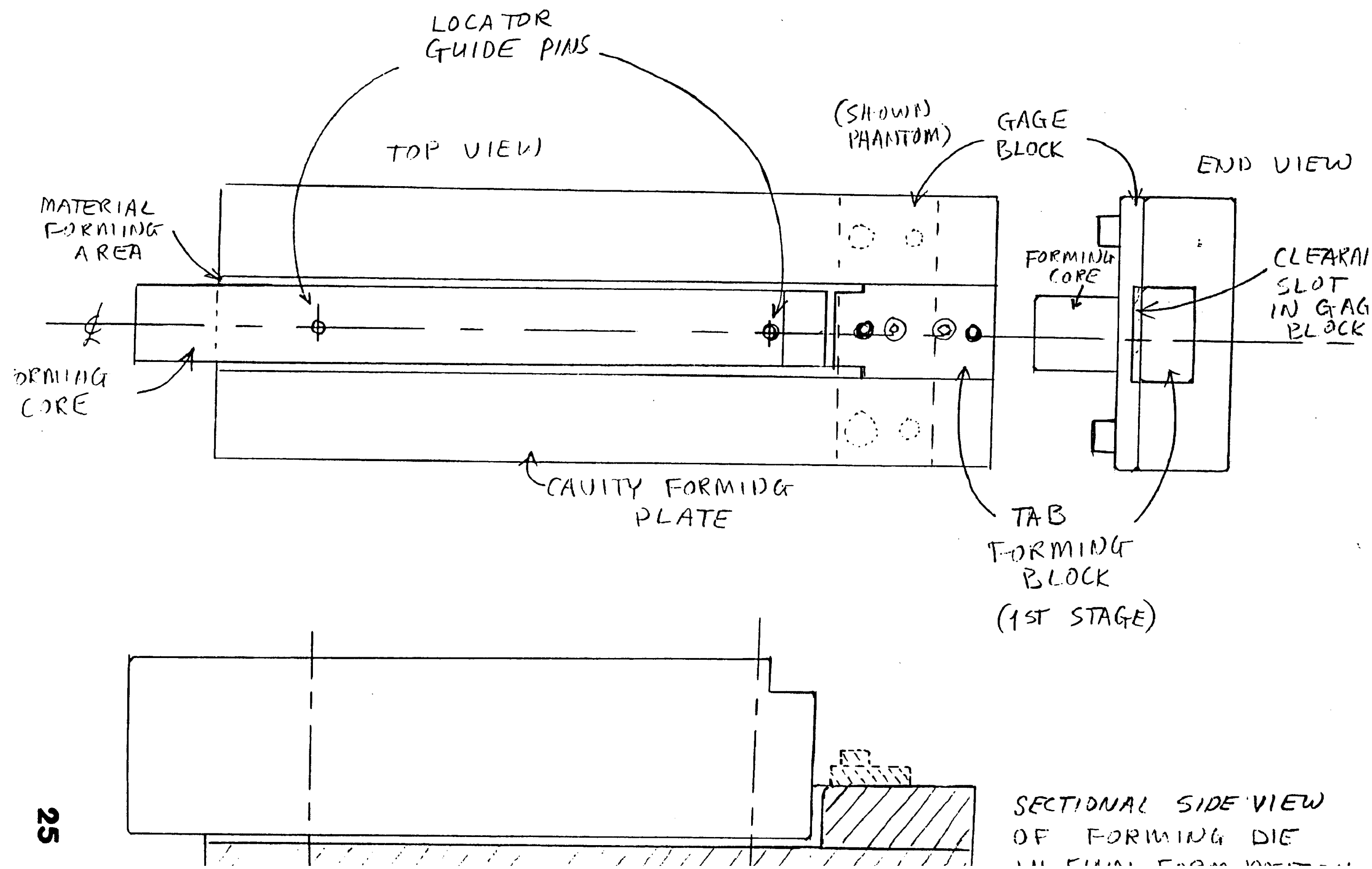
HALF SCALE
1/2" = 1"

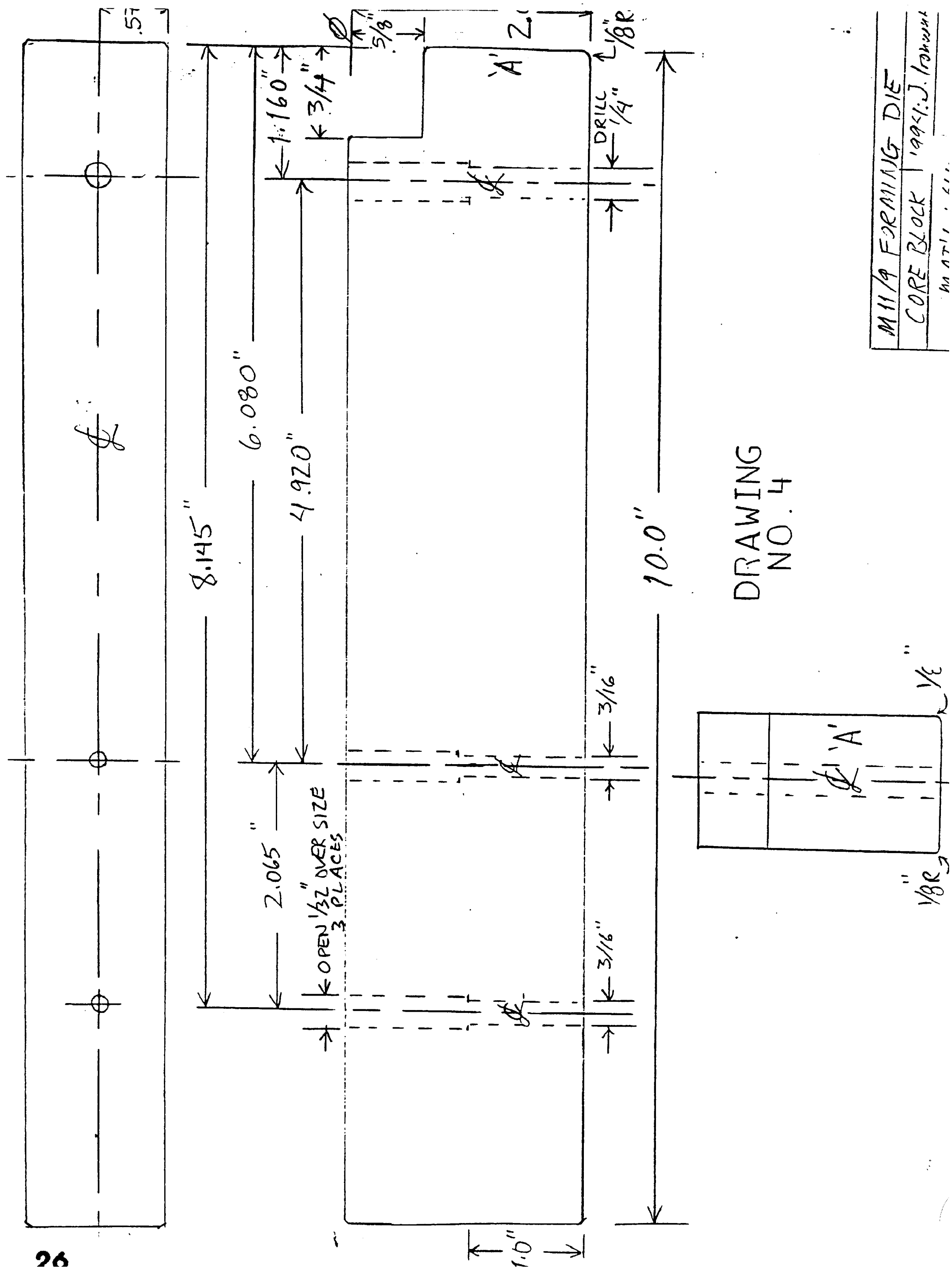


DRAWING
NO. 2

M11/9 FORMING DIE

DR. WING
NO. 3


LOCATOR
GUIDE PINS
TOP VIEW
(SHOWN PHANTOM)
GAGE BLOCK
END VIEW
MATERIAL FORMING AREA
FORMING CORE
CORE
CAVITY FORMING PLATE
TAB FORMING BLOCK
(1ST STAGE)
SECTIONAL SIDE VIEW
OF FORMING DIE


M11/A FORMING DIE
CORE BLOCK
DRAWING NO. 4
8.145"
6.080"
4.920"
2.065"
10.0"
1.160"
3/4"
5/8"
1/8R
DRILL 1/4"
3/16"
3/16"
OPEN 1/32" OVER SIZE 3 PLACES
1.0"
'A'
'A'
1/8"
1/8R"

The next step is to "section" the remaining piece of metal using simple math and cutting two lines of metal from the bottom surface, from the front end to rear of the two sides. Stop at the point where the rear was cut down vertically for the tab. These lines are laid out on the bottom, measuring in to the center from each side .650". Remember to make the cuts *in the scrap space* to the center between the lines. The side with the rear tab will have half of the frame bottom attached. A cut is made at a right angle from the right side as shown in the TOP VIEW of the drawing. This leaves one side with the entire tab extending from it. Leave a little more on the two sides than the print calls for to grind or file away til the two halves pressed against each other measure the required 1.150" distance inside. Cut away the extra width of the tab opposite the side it is attached to and grind or file to the correct dimension, but *only after* clearing the rough opposite edge on a line with the *inside* edge of the side wall. Then, the relief is cut in each side at the base of the tab. If the stock kit will be used, the darkened areas of the print need to be removed. If this area is not welded, is can more easily be opened up if a stock kit is desired later. Should the frame be fabricated for the construction of a semi-auto unit, it will not matter whether it is welded or not. You can not stock a semi with the stock designed for the SMG unit.

This work should not be done by cutting the entire tube in half after the contour lines have been placed, since some care should be taken to preserve the extending tab as one piece. The reason for this is that these two halves must be welded back together, and several holes will have to be drilled, some of them would be through the welded areas. Drilling through weld can be less than a good time! It can ruin your day and your project.

Notice that there is space left inside the frame in the bottom corners. This is for the rails of the stock kit and the SMG trigger group parts are designed to contour around these rails. To satisfy federal regulation, the rear sight/backing plate is long on the M11/9 semi kits and has no relief for the stock rails. Any one desiring to install the stock will have to cut these reliefs into the back plate or purchase the SMG back plate separately.

Prior to welding the halves, layout the holes and openings inside the bottom of the frame and avoid these areas. In fact, no more area is welded than absolutely necessary. The tab bends are most easily made in something like a bench vise prior to welding the halves together, and all welding can be done in one process. Take great care in the sizing of the width of the tab, and after bending, it can serve as a gage to finish the bottom halves to size. With the bends made in the tab, it can be clamped more easily for welding.

If the builder is a perfectionist, the bottom of the 45 degree junction may be laid out with enough extra 'meat' to allow cutting the radius designed in the gun. Holes could be drilled prior to cutting, centered so the drilling made would leave the required radius. However, no radius is necessary here. The radius at the front of the frame is for comfort and safety, as well as streamlining the contour, and is especially simple to cut into the metal using a disc sander or a belt sander mounted upside-down in a bench vise. This technique lends itself as well to that work at the upper rear of the frame and
at the sides of the rear after the second welding of the backing plate (rear sight plate).

Make note of the fact that it is not imperative that both sides of the frame be identical in height. The dimensioning of the height of the holes in the sides of the frame are established from the outside *bottom* of it. The height of the left side wall should not be so excessive that it interferes with the seat of the upper receiver which has factory pressed reinforcement ribs in it. Attention must be given to the thickness of the metal used in the frame when dimensioning the height of the holes in the sides. The dimensions shown in the 'SIDE LAYOUT TEMPLATE' are given from the *outside bottom* of the frame. The assumed flat thickness is .075". Material that will be found in the scrap yard may be heavier. Much thicker may be used in fact, but the finished product will be more bulky and heavier. (The model 10 Ingrams were stamped from 12 ga. = .105" thick) Most importantly though, is that the difference of the extra thickness must be added onto the .075" for the dimensional height of the pins to be correct. The overall outside width will have to be

ground or cut for clearance in the areas of the trigger and the sear pin placement, also. If not done cleanly, the looks will appear a bit 'cobbled', and function of the selector may be a little rough. Inspection shows that metal up to .100" can be used with no problems that can't be solved during fitting, however, there is no real advantage to a heavier thickness of metal, It isn't enough of an increase in strength to justify the hassle it will create to fit the pins. The finished lower reciever must have an inside dimension that will accomodate the upper reciever, and an outside dimension that will still work with the tolerences manufactured into the factory produced parts. The production of sheet metal is still a variable process unlike say, the production of precision ground flat stock tool steel. A difference of .005" to .007" is not unusual with sheet metal. It would be intolerable with tool steel.

Now, it is important to be mindful of the previously mentioned 'simple math'.
Assuming that the tubing used is 2" by 2", and the thickness is 14 gauge, illustrated here as .075", this math applies:
The inside frame width must be no narrower than 1.150". It can be as wide as 1.175", but is best no wider than 1.160". The inside dimension of the 14 gauge 2" square tubing should be 1.850" give or take .005". However, in the machine shop, never assume anything! Check the actual size with the dial vernier calipers or micrometer and measure the wall thickness. All print dimensions assume a 1.850" inside dimension for 2" square, 14 gauge tubing. This must be reduced to 1.150"

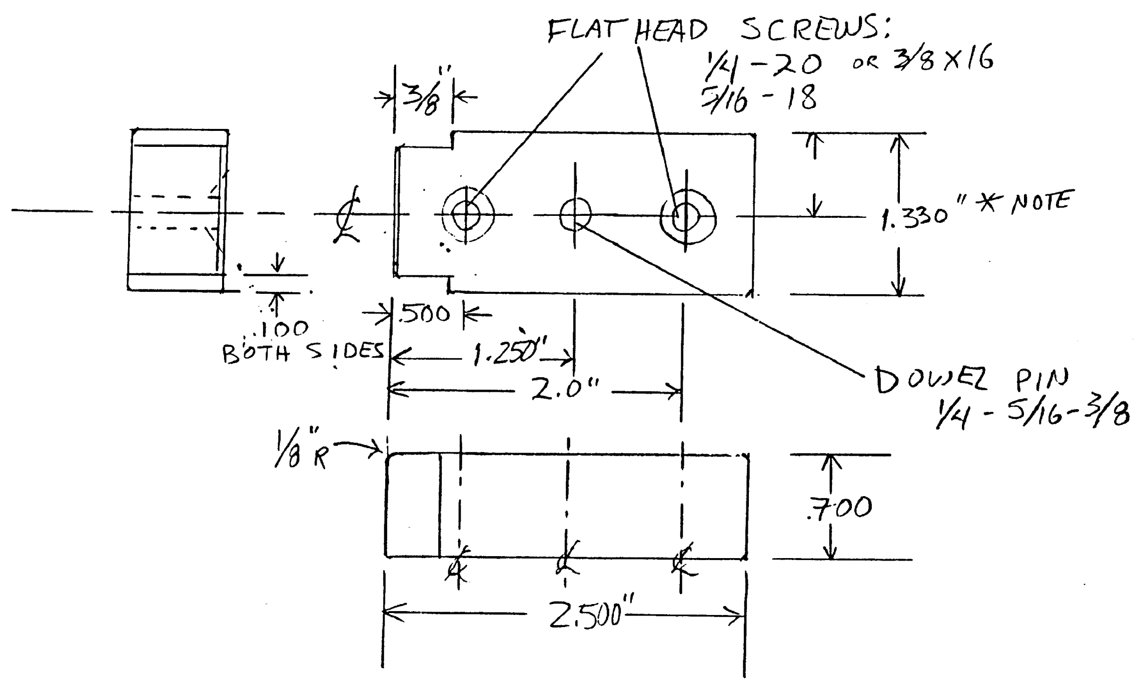
Since it is easiest to work from the outside, the scribe lines for the bottom cut are placed from the outside edges and on the bottom. Remember to keep the production weld seam in the tubing in the top scrap and lay out the bottom for the cuts as shown in the drawing 'TOP VIEW'. The amount to be removed with 2" tubing is .700". But, double check the thickness of the tube wall, and the inside width.

Most individuals ignore both the safety assembly and the stock assembly. The stock *looks* 'cool', but has little functional value. Many builders use the insert rails as a base to devise a better

'from the hip' holding attachnment to control the weapon, especially in full auto mode of fire.

The 'welded seam' approach can also be used with three pieces; two sides and the center piece, welding the side corners. Clamp onto a mandrel with the corners milled away 1/4" in each direction prior to welding. At this time of writing, side flats are available from one company and the center flat is available from another, both with all holes and reliefs punched, except the sear/selector pin holes. (Authors note: This *may* vary as pressure is put on the manufacturers. The last side plates seen had no trigger pin holes.) It is suggested that the fore mentioned mandrel still be used, but with the pin holes carefully drilled on proper locations as shown in the 'SIDE LAYOUT TEMPLATE'.

The mandrel must be 1.150"-1.160" wide. The center piece can be best located if the sear stud hole is established in the bottom of the mandrel. But, *instead* of drilling it to size, drill and tap it for a #10 screw. Clamping the center peice should be easier holding the front with a #10 cap screw. (Two birds - one screw!) The back 1/4" stock block mounting hole is transferred into the mandrel as a tapped 1/4" hole, and there is the rear clamp! The trigger pin and receiver connector pins are installed through the side pieces and the mandrel to locate everything for welding. REMEMBER TO USE THE BLUEPRINT LAYOUT HEIGHTS FOR THE <u>MANDREL</u>. THESE DIMENSIONS DO NOT INCLUDE THE THICKNESS OF THE FLAT. IF THE SIDE LAYOUT TEMPLATES ARE USED, THE DIMENSIONS OF THE PINS WILL BE TOO HIGH! If the sear/selector pin hole is also drilled in the mandrel, use the right side dimension (.250"). In placing that hole, simply mark the dimension and drill through the mandrel. The same dimension is marked in the right side piece and the clamped assembly is drilled through both sides at once. Careful, square placement of the .250" hole will insure easy, precise alignment of the holes in both sides, one to another. Then go back and carefully open the left side hole to the required dimension after welding, depending on the large diameter measurement of the selector pin. (Either .281" or .290")

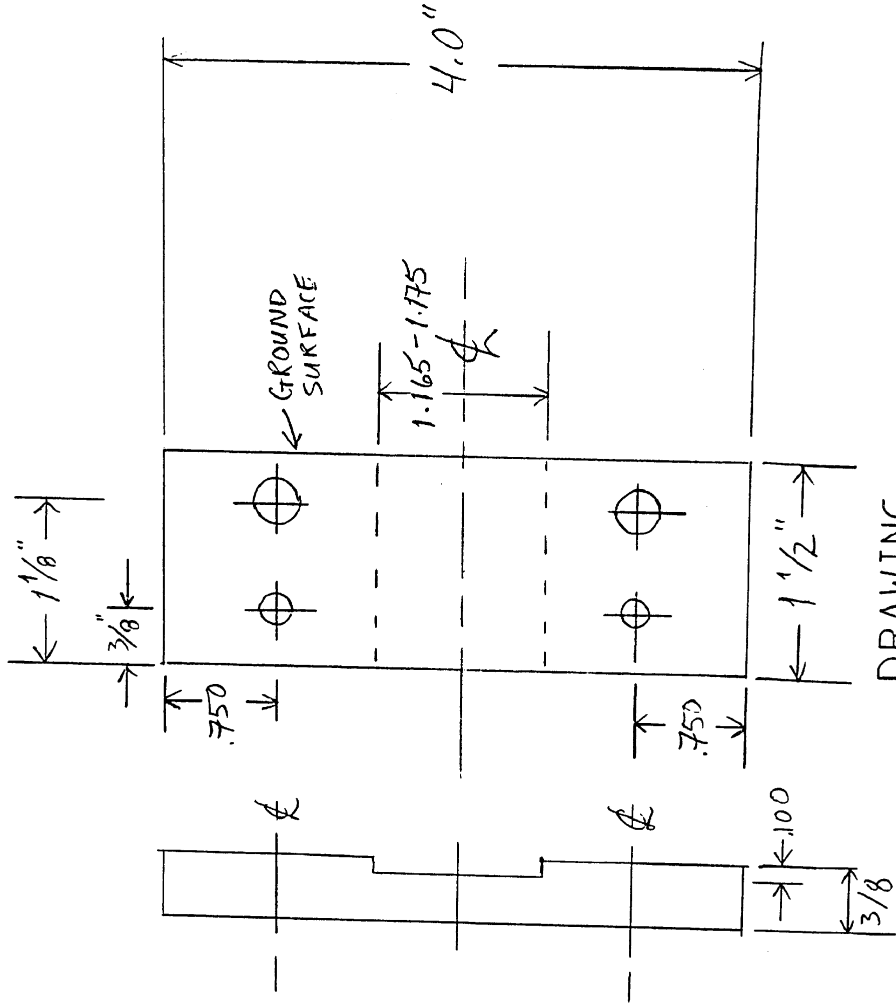


DRAWING
NO. 5

* NOTE: MAY BE CALCULATE
TO THE FLAT THICKNES

M-11/9 FORMING DIE	
TAB FORM BLOCK	94 : J. Ironwood

M-11/9 FORMING DIE



DRAWING NO. 6

Now we can get back to <u>folding</u> the flat. This method is the most basic: We begin assuming that some kind of mandrel (Forming block) has been made with particular attention paid to the ever so critical width dimension. The flat is clamped up in a bench vise, or between two very flat, and preferably at least one inch thick slabs of flat stock on a scribed line representing one side of the inside dimension. If the particular depressed condition allows no source of heating torch such as oxy-acetylene or mapp-oxy gas, the flat must be bent cold, beginning with light hammer strokes along the line where the metal protrudes from the clamping vise or slabs holding it. Work back and forth along this line until the first (primary) fold is made. Heavier strokes are confined to the very corner edge and used to insure a clean, sharp corner. The flat is then removed from this clamping and clamped to the mandrel that was made to assure it's being formed to correct dimension. It is then formed a second fold in the same manner as the first fold, and both sides and the bottom are checked for flatness, straightness, and square. It is further double checked for the desired inside dimension. The first bend of the tail tab can be made in a bench vise, and then final formed (second fold). Do not be distressed if the sides are uneven. As previously stated, the heighth is only important on the left side to clear the impressed reinforcement in the upper receiver, and to clear the bottom of the ejection port on the right.

If a heating torch is available, the process may be done more easily, but take care to wear heavy gloves designed to protect the hands. If something slips, it is a normal reaction to keep it from falling. One could easily be branded for life with such a mistake!

The best is saved for last. This is the method that will assure the best results, but as may be expected, it is a machine shop project. That is not to say that a 'novice' cannot complete it. It is simply isn't easy. But, it is indeed something to be proud of.

This is a forming die to precision form the receiver channel with the quality of a factory produced item. It is composed of:

A Cavity Plate,

A Forming Core Block
A Tab Forming Block
A Gage Block
Six Dowel Pins
& Four Mounting Screws

The 'formula' to prosperous die forming is unchangingly simple. And, if a picture is worth a thousand words - take a look at drawing number 1.

The critical width dimension of the forming block or 'core' of the die is as we have discussed earlier 1.150". Since this is a minimum, and it is the base measurement for the rest of the die, it is a minus zero, plus .010" dimension. It can be a little more, like plus .020", but that is all it should be, and what ever it comes out to, that is the base dimension for calculating the relief in the cavity plate.

If the core size is too wide, the upper receiver will fit sloppy. This can affect magazine alignment enough to cause jamming because the magazine is not aligning with the bolt face and/or feed lips. Also, the extending tab width will not fit the dimension between the side walls correctly. In the primary welding of the top rear, and before placement of the back plate, it is important not to have *any* weld "burn through" inside the recess of the rear top. This area will hold the upper receiver in proper aspect to the trigger group. Be mindful that globs of weld inside this relief are very difficult to remove. One solution to this occurrence is to clamp onto a block of electrode carbon, such as that used in the EDM process for the welding. The carbon will block any weld through. However, proper fit is a more realistic answer, and careful welding. Chapter four will detail welding & dimensioning the bent tab.

In a formula reference, 'X' is the core, 'Y' is the flat thickness, 'A' represents the tolerance space, and all of this equals the finished cavity cut 'Z', which is the dimension of the actual cut to be made in the cavity block. It must be wide enough for the core forming block, two sides of the channel formed receiver, and two thin tolerances, one on each side of the side walls. So, the

core, as shown, is 'X', and it is the base reference measurement.

In pure math, 1.150" is the core, plus 2 (sides) times .075 (or, .150"), plus 2 (tolerances) times .005 (or .010") equals, 1.310":

1.150"	Forming Core	
	.075"	Flat Thickness
	.075"	Flat Thickness
	.005"	Tolerance Space
	.005"	Tolerance Space
	= 1.310"	Cavity Cut

Getting into accelerated cams and multiplex angles and forming surfaces, the
math is very difficult. This is very basic and simple. To make it even more simple, use the dimensions shown in drawing number 1. But please, remember that all flats must be gauged (measured) that will be run in this simple die. If the thickness of the flat exceeds .080", it may, as did this humble author in the testing, stick quite tightly in the die. In other words, if the flat measures heavier or the material intended to be used as a flat is heavier than .080", it will be necessary to add the difference to the cut. Also, if there is more than one flat to fold, and more than one thickness to deal with, the dimension of the cavity cut may have to be compromised. Some of the thinner ones may require a little 'squeeze' after forming to assure they will be square when welded. The 'C' clamps should take care of that. 085" should be a safe figure for thickness for all flats produced by Cobray (or, sold by RPB). Under NO circumstances must the basic minimum reference measurement: 1.150" be reduced. Use the heaviest thickness as the Flat Thickness in the formula, and add the Tolerance Space as shown. The blueprint of the forming die shown uses the flat thickness of a compromise .090", which has proven itself to work. This is a Flat Thickness of .085" and includes the Tolerance Space of .005".

Making the cavity cut, use a piece of flat stock at least one inch thick. It may be heavier, but should not be thinner. Cold or hot rolled metal will work fine for home benders, but production benders will want not only a better grade of metal, but a

progressive design in the die. This is not a production die, and a tool grade alloy is much more expensive to use, as the metal in it is formulated to resist wear and pressure. It can also be more difficult to machine.

The base dimensions for the one inch thick flat stock is four inches wide by 13 or 14 inches long. The slot must be .700" deep by the established formula width. This cut should be made down the entire length of the piece. In the event the die will only be made for producing M12/380 (M11) frames, the length of the flat stock to be machined may be two inches shorter. The design shown however, will form both the M11/9 and the shorter M12\380 (M11).

Making the forming core block begin with a piece of 1 1/4" thick by two inches wide material, ten inches long. An alloy steel such as 4140 is best, but used with care, cold rolled mild steel will work fine. The two sides must be machined so the thickness is diminished to the basic reference size of not less than 1.150", and finished smooth.

One end of the core block must be machined as square as possible. It too, is a forming edge. If milled, the finish should not be rough. It costs more, but grinding to finish dimension is a much better finish. However, a fine finish can be achieved in a mill by a competent machinist. Locate and place the front stock mounting hole centered in the width of the forming block and 1.125" from the squared edge of the block to the center of the hole. Location should be placed only after finishing the two sides, bottom, and one end smooth and square. Lightly chamfer both sides of the hole after drilling completely through the two inch width of the forming block, and grind, file, and polish the bottom square end corner to a 1/8th radius for the final form bend. The bottom corners of the width are struck with a file only hard enough to 'break' them from being sharp.

Using this hole as zero move 6.962" on center and drill the sear

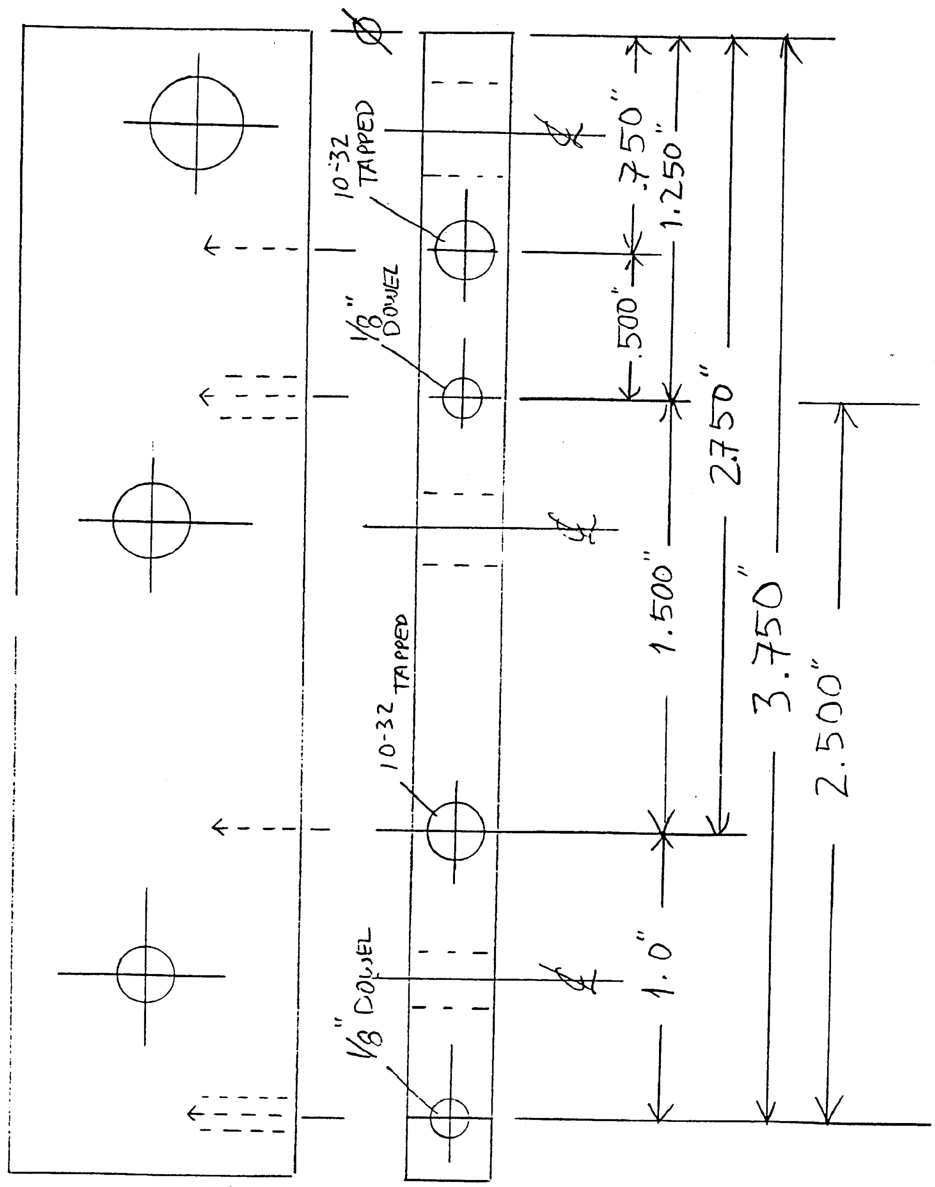
stud hole, or clamp the M11/9 flat in place, located by the guide dowel through the front stock mounting hole and transfer and drill the sear stud guide hole on center. Only a little stoning or flat filing is necessary after radiusing the bottom corners of the sides and tab forming end by hand. This block is finished with clearance cuts made in the tab forming end at the top as shown in drawing number 9. Machine or saw cut the corner down 5/8" and into the block 3/4". This will allow clearance of the first tab bend at the bottom of the final form stage. These two holes comprise the guide holes for forming the M11/9 frame. To also be capable of forming the M12/380, either find location on the front stock mounting hole and move 4.920" and drill the sear stud hole in the block or clamp an M12/380 flat as done before with the M11/9 flat, locating by the stock mounting hole, and transfer the sear stud hole from the flat. Again, being certain to keep it on center. You now have three guide pin holes. The 1/4" hole for the front stock mounting hole guide pin is used for both types of flats. Only the sear stud hole guide pin need be changed for forming from one flat to the other. Then, drilling from the top of the forming block, open the guide pin holes 1/32" beyond present size down one inch. BE SURE TO ONLY DRILL DOWN ONE INCH FROM THE TOP SURFACE. If you are using a piece of material other than 2" wide for this block, just remember to leave one inch of the original hole size unchanged from the bottom up. The purpose for the clearance in these holes is to make the removal of the guide pins easier, as they often stick no matter how much grease is used, and the finished frame is much more easily removed from the die by FIRST removing these guide pins. They also, don't get broken so often that way!

Next, make the tab folding block to form the first fold in the extending tab of the flat, and the second bend formed in the final fold procedure. The finish dimension of the width of the block is the formula width of the cavity cut by .650" thick (the depth of the cut). It should be three inches long. Cold or hot rolled mild steel will do fine, though once again, tool steel alloy is best.

Start with a piece of 3/4" by 1 1/4" steel, between two and a half to three inches long. Machine to dimensions and square one end

precise. The squared end will face against the squared end of the forming core block to make both of the tab area bends. The width need not be a slip fit, but should be held at .005" to .010" under. However, if it is held to a clean slip fit, it may be used to dimension the drilling fixture covered later. Be sure to read through to that coverage before doweling it in place. Drill and ream the mounting holes in the block as shown in drawing number 10, and transfer them into the cavity cut from one end of the plate. Be sure to use flat head screws to mount the block. Countersink (chamfer) the screw holes for the flat heads. The reamed holes can be either slip or press fit. The block stays there. Be certain to relieve the sides from the front corners as shown for the travel of the flat's sides during forming, following the dimensions shown in the drawing. Failure to do this will result in certain damage to the tail sides of the frame during forming. However, before mounting, radius the top corner of the squared end for approximately a 3/16" radius and polish it slick. Before proceeding, be certain to have the clean, squared, radiused end of this block facing into the remaining cavity area. Should you make a mistake and radius the wrong side of the block, just radius the correct side and go on. It will not hurt the function of the die. Set the dowels and screws and proceed.

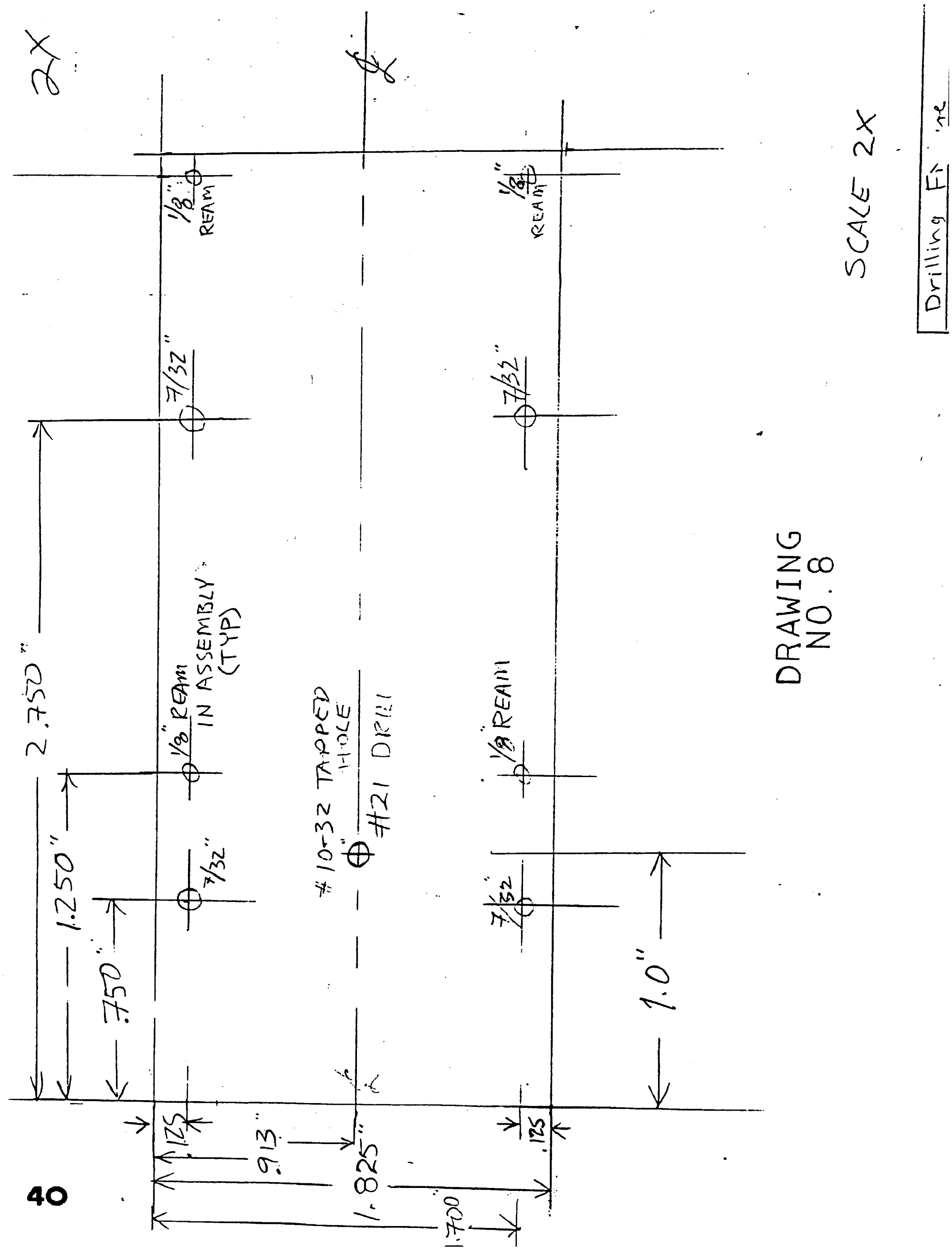
Divide the formula cavity measurement in half and use this dimension as center line for the placement of both the sear stud hole and the frontmost stock mounting block hole guide pins. Drill and ream the front stock mounting hole first using a modified version of the formula for the cavity cut. This time use the distance from the face of the tab forming block, plus the dimension used for one side in the cavity cut formulation. (Flat thickness plus tolerance) and add 1.210" to center of the stock mounting hole. Once again, it may be necessary to compromise the thickness allowance for forming more than one flat with varying thicknesses. .085" should be sufficient for all flats produced by Cobray (or sold by RPB). Drill and ream this hole for a slip fit to the dowel pin.

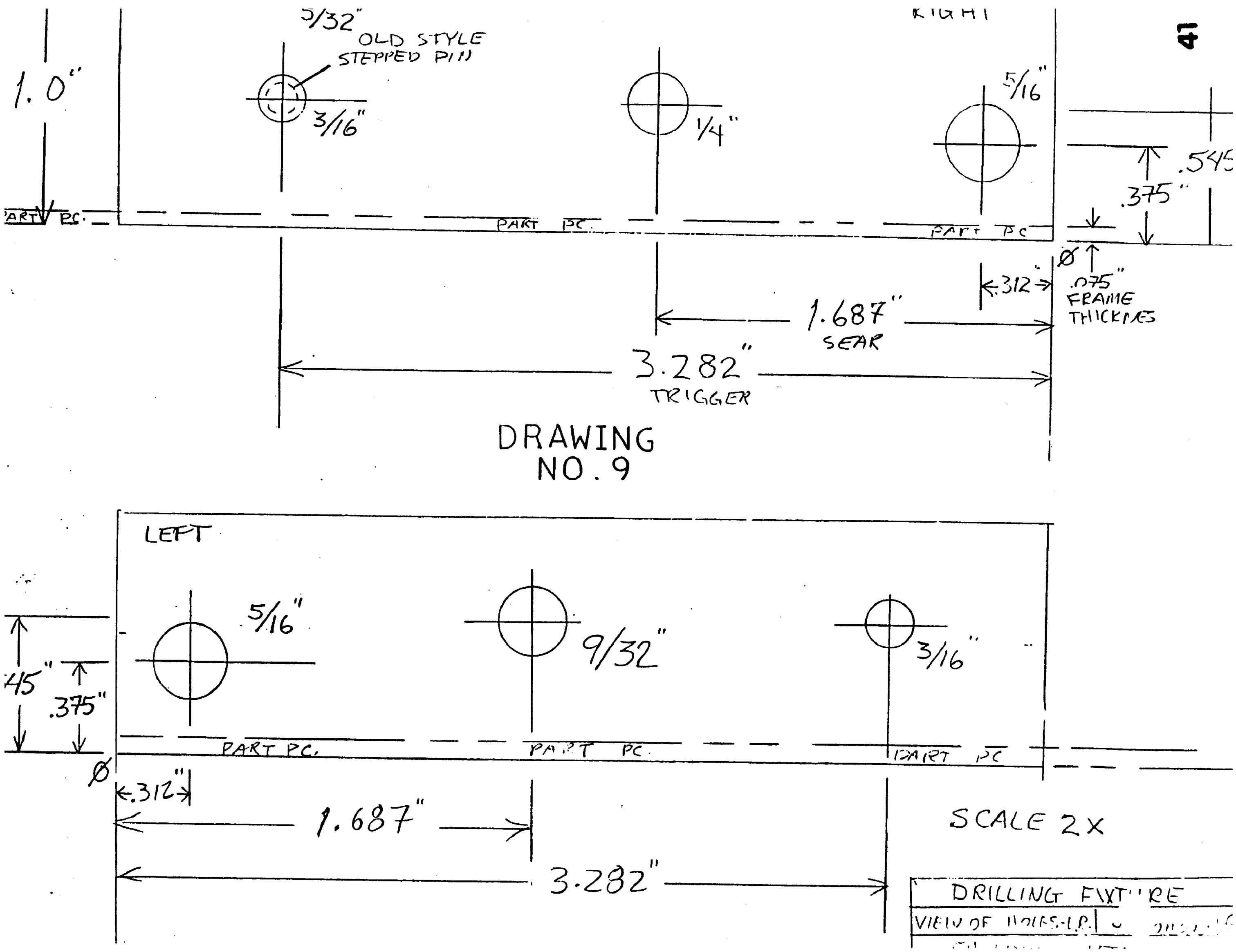


DRAWING
NO. 7

SCALE: 2X

DRILLING FIXTURE


2X
2.750"
1.250"
.750"
.125
.913"
1.825"
1.700
.125
1.0"
7/32"
1/8" REAM
1/8" REAM
IN ASSEMBLY
(TYP)
#10-32 TAPPED
HOLE
#21 DRILL
1/8" REAM
DRAWING
NO. 8
SCALE 2X


5/32" OLD STYLE STEPPED PIN
RIGHT
1.0"
3/16"
1/4"
5/16"
.375"
PART PC.
.312
.075" FRAME THICKNES
1.687" SEAR
3.282" TRIGGER
DRAWING NO. 9
LEFT
5/16"
9/32"
3/16"
.375"
1.687"
3.282"
SCALE 2X
DRILLING FIXTURE

The forming core block is placed in the cavity cut, locating the two holes of the stock mounting hole location (cavity and core) together by the guide pin. Thus held, use two pieces of metal shims (or, drill bits) the size of the metal thickness plus the tolerance space at the front, one on each side to center the block in the cavity cut. Clamp the block in place, transfer, drill and ream the sear stud guide pin holes, both M11/9 and M12/380 to a slip fit.

This is the best part, because it is the last part of the die! It is the gage block for forming the first bend in the extending tail tab. The drawing number 5 details this block.

Begin with a piece of cold rolled flat stock at least 1/4" thick. It must be 1 1/2" wide .If you have chosen a piece of metal wider than four inches for the cavity half of the die, you may wish to cut a piece as long as the width you have chosen. Room for variances has purposely been left in this, as this is a 'survival level' construction report, and the reader may not have available anything more than scrap to chose from.

Assuming the cavity is four inches wide, the finished, squared length of the gage block is also four inches. Just as the cavity cut was made as closely to center as possible, so will the clearance cut in the bottom of the gage block be made so close to center. The clearance cut however, will only be .015" wider than the tab width, so, 1.150 + .015" = 1.165". The clearance cut may be .110" to .125" deep. However, for the commercially available flats, the clearance cut need only be flat thickness plus .005" to .010". Drill and ream the dowel holes and drill the clearance holes at the dimensions shown. It is not necessary to counterbore the screws.

To locate the gage block, use the prepared flat, either factory or homemade, and place it centered on the cavity plate REVERSED to the direction of the final form position, so that the tab hangs over into the cavity forming area. At the same time, the length of tab protruding into the cavity forming area is measured and the flat is kept centered on the cavity plate and squared to it. The

measurement must be .650" to 660" from the forming face to the end of the protruding tab.

Carefully clamp the flat in place solidly, and place the gage block over the tab, and firmly against the side 'wings' sticking out to either side. These 'wings' will be the gaging surface to form the first bend of the tab. This is why the builder was urged to recognize the importance of squareness in the section covering the manufacture of the flats.

Thus located, clamp the gage block in place and transfer the screw holes. Drill and tap them into the cavity plate. Then return the gage block to it's position and lightly tighten it down to the cavity plate. Insert the flat again, remeasure the tab distance and double check the square of the gage block. Tighten the mounting screws, double check square after tightening, and drill and ream the dowel holes.

The best doweling fit for these holes is to ream the cavity side of the holes as a press or even a tap fit. The holes in the cavity side may be blind drilled, not coming through the plate completely. It is best that the dowels only protrude the height of the gage block from the cavity plate. The dowel holes through the gage block should be a slip fit, or even a carefully drilled hole, using a lot of lube, and pecking as you go til you pop through the other side. This plate will have to be removed after each flat formed, and left off for the second and final form stage of the receiver channel. Location of the flat for final form will be determined by the guide pins. How well it forms is determined largely by the radius hand cut into the top guiding edges of the cavity cut on both sides, and the radius on the tab forming block at the rear. These should be about 1/8th radii and polished slick. The radii on the matching surfaces of the forming core should be very small, actually just breaking the corners. The better all forming surfaces are polished, the better the die will work.

In both stages of forming, the liberal use of lubricating grease is advised. Lube everything well, including the guide pins and both sides of the flats to be formed at least in the central areas, and the cavity of the die. Too much grease is not a problem here. No

lubrication however, is quaranteed to be rough on the die. This is especially true of soft mild steel. Since the die was not designed or built for massive production it surely doesn't have to last a long time, but the builder will want a finished product to be proud of; not a formed flat that has scrapes and gouges from galled metal and pry bar marks getting it loose. The grease will come off. The marks in the steel are another thing. There is still work ahead, so why make more than necessary.

Remember to turn the side of the flat with the snake logo and "SAFE-FIRE" up
to be visible when forming the first form of the tab. Then, when placing it in the final 'channel' form position over the guide dowels, turn it so that the first bend just made is pointing up and the markings are down. Location of the right side relief is critical that the channel finish being formed with it to the right. It may seem stupid, but it is an easy mistake to make that only creates more work to clean up. It may be an added precaution to use a black magic marker and mark the flat on the side that will be the outside bottom when it is finished. This may be especially helpful with the homemade flats that will have no other markings. When loading the flat for first tab forming, be certain the mark is up. For the second and final channel form, be certain the mark is not visible. If the homemade flat is formed without the relief, it will reduce the possibility of an error. It is not, after all, much work to hand cut the relief into the right side.
Perhaps it seems that the forming die is a lot of trouble to make to produce a
receiver channel. That may be, but compared to every other option explained,
and a couple avoided like the plague, . . well, you just have to see the difference to believe it. In the wildest of oppressed conditions, "pretty" really isn't a consideration. But, in the study of mechanical engineering, very much like the study of welding, well structured metal formations are more than just pretty. They are stronger. Also, bear in mind that the frame still has to have precision holes placed, and that is best done from a flat square premise, not a bumpy, lumpy, jagged, crude formation. For the perfectionist, the job can't be done without this die! But regardless how you have formed the frame, it is important at this

time to inspect it thoroughly, and getting a second opinion is a very good idea, to be certain that the bottom is flat and square to the sides, and the front is square to the length. The square of the back of the sides to the length should have been well checked before forming.

Let's drill some holes.

CHAPTER TWO
THE TRIGGER GROUP

Conversion of the existing M11/9 semi-auto, as described earlier, requires modification of the existing frame to allow it to receive the SMG trigger Parts. The largest obstacle in the way is a bent piece of metal inside the frame to the front. It should be obvious that one of the tricks to welding sheet metal and avoiding warp, is to fill holes, thus minimizing metal shrink. Therefore, careful examination will show that the bottom center weld in this bent metal piece can be seen pretty clearly in the metal finish. It is centered in both directions inside the two bends of the piece. Actual location from the front of the gun is 1.25" (1 1/4") It is suggested that the flats were originally stamped for the SMG models, since the SMG safety slot and detents are evident as well as the stock latch block mounting holes to the back. Only the sear stud hole has been eliminated. To avoid any more holes than necessary, this weld will have to be cut carefully to remove only the metal from the bent piece, not cutting through the bottom piece. Of course, the simplest method is to drill a hole through both pieces to remove the weld, but then you have a hole to fill (or leave for a drain). The sear stud hole still must be placed at one inch centered. So, for the least hassle, drill the sear stud hole on location through both layers and cut the weld in the center of the bent piece only through the thickness of that piece. Do this after removing the entire trigger group parts set. Then, after removing the bent tab weld to the right side, a sharp tap with a cold chisel at the lap of the two in the front should knock out the bent piece, however, the best method is to mill out the area surrounding the weld and forward to the inside front edge of the front bend, using care only to cut the metal of the insert piece and not the frame. However it is accomplished, care must be taken not to change the square shape of the frame. A sharp cylindrical 1/8" carbide cutter in the Mototool will do as well, and the separating disc in that tool is great to cut the weld at the tab, though it surely can be done with a hack saw blade. Be certain to clean up any rough weld left after the cutting or drilling is done .

With the safety switch removed, there are now two holes

approximately 1/4" in diameter, one in each side of the receiver 2" behind the 5/16" holes at the front. These safety holes are useless, as the SMG trigger group incorporates a completely different safety design that uses the slot near the tigger. These can be welded up or filled with an epoxy filler like J.B. Weld, or the similar grey colored Loctite epoxy, then sanded smoothe and painted, or not - to your liking. A new set of holes must be drilled for the sear/selector pin at the proper locations using the side plate layout dimensions. The trigger pin holes are close enough to work as they are for the SMG trigger parts set.

On the bottom right side at the trigger slot there is another smaller slot in line with a hole and a detent relief. This is the mounting hole for the SMG safety. In the unlikely event that the production semi model gun does not have this slot and detents, they will have to be drilled and cut if the safety is going to be installed. It is usually ignored.

As the forming die is to the making of the frame, so is the drilling jig to the making of the trigger group holes. In this design, the sear stud hole is used to align the frame to the rest of the trigger group holes. It is really only time saving if you have several frames to drill. It is again, the perfectionist's tool. All of it should be fashioned from hardenable tool steel like oil hardening 1/4" flat stock found in any tool supply house. Mail order tool sales companies are a part of the source lists found in the back of the book. Practically all of them stock O-1 precision ground flat stock. O-1 is an oil hardening tool steel that will not wear after heating and quenching in oil, which hardens it and this explains the 'O' in O-1. Most machine shops will have scraps of O-1 they will most likely part with for a small part of what you can expect to pay a tool supplier. Of course, then there won't be that excellent piece of scrap left over to make a hunting knife. Other types of tool steels can be used sucessfully, too. A2 is an air hardening tool steel, and W2 hardens by quenching in water. D2 is a tough die steel that is intended to be hardened in a controlled air environment, but will oil harden as well. Care must be used if this is done however, as it becomes brittle enough to

shatter if struck a hard blow.

Three pieces, four inches long are necessary. Two of them are 1/4" by one inch. The other one is 1/4" by 2". The flat thickness used to determine the distance from outside bottom of the frame to the correct hole placement height was .075". No tolerance is necessary. If the tab forming block made for the forming die is held to exacting 'slip fit' dimensions, it can be used as a gage to set the inside distance between the sides of the jig for their attachment to the bottom piece. As is visible in the drilling jig print, the two sides set on the bottom plate, flush to the bottom of the frame. If the frame is formed cleanly enough, the sear stud hole can be transferred from the bottom of it to the bottom piece of the jig. Or, be trusting, and use the blueprint. It works. USE THE SIDE LAYOUT TEMPLATE FOR THE SIDE PIECES of the drilling jig. Remember that these locations are from the BOTTOM of the frame and include the flat thickness. The SIDE PLATE TEMPLATES are to be used for both the direct placement of the trigger group holes and the drilling jig holes.

Begin by marking one of the one inch wide pieces in the upper right corner, 'right', and the other in the upper left corner 'left'. (Or, R and L) These will be the outside surfaces of those pieces. From this point remember that the dimensions for the right side plate are given with the zero at the bottom right. The dimensions for the left plate are given from the bottom left. These dimensions are the same, just headed in opposite directions. The height dimensions are established using the nominal flat thickness of .075". So long as the flats are within .010" either way from that there will be no problem. If the thickness is more than that, you will need to add the difference. Only the hole sizes will vary. See the drawing set numbered 7 through 9. Drilling them with a clean sharp drill should be enough. It isn't necessary to ream the holes to size. In fact, after hardening, it could cause some problems. A drill just about always makes a slightly larger hole. (plus .001" to .003")

To finish the jig, the metal should be flame hardened taking care to only bring it into the red color spectrum before quenching in oil (Using the recommended O1 flat stock). Old motor oil from

an oil change works fine. All pieces should then be polished to a silver finish (It needn't be a bright finish) and slowly reheated preferably in a piece of 4" wide channel iron, playing the flame on the channel instead of the O1 metal, until it takes on a little tan (light straw, in the heat treat business). Dark brown or blue is a little too much, but if these colors appear only at the corners or as streaks through the O1, it will still be hard enough to be servicable. At this point, leave it alone to cool as it will. DO NOT QUENCH IT WITH WATER!!! It should leave a light tan with brown streaks through it. With some care, this process can be done on the kitchen gas stove. It may be possible on an electric range. Tell the cook to lighten up; if the metal has been cleaned in a solvent like MEK or acetone, it won't stink, smoke, or hurt anything! Should any holes shrink enough in hardening to seize on a drill, polish the hole open with emery cloth or light circular strokes with a small diameter grinding stone in a Mototool or die grinder, fitting the holes to the corresponding pins. The absolute, best way to finish this assembly is on a precision grinder, lightly cleaning-up the top of the bottom plate, then, in assembly, grind the insides parallel to each other careful to stay close to the outside dimension of the frame. Experience shows that 1.350" is not excessive.

To use the drilling jig, simply place the frame in the jig, front to front of jig and locate it with the 10-32 screw through the tapped sear stud hole from the bottom, and use the forming core or mandrel inside the frame securing it with a clamp to the jig during drilling.

The steel used for the MAC flats is an alloy 4140. It is a bit more resistant to machining (drilling) and must be drilled with clean sharp drills and a quality cutting fluid. Don't rush this drilling and the holes will be clean, close, and dimensionally stable, assuring proper function of the gun. Be patient and deliberate throughout construction, and be confident that these instructions will work if you take the time to do it right.

To guarantee the best certainty of hole placement, and minimize flex in the sides during drilling, after placing the forming core of the forming die in the formed flat channel, or using the forming

mandrel created for that purpose, clamp this assembly in the drilling fixture. Clamp from the top of the forming core to the bottom of the drilling fixture, and locate the sear stud hole through the frame and into the core with the 10 screw as described above. The 10 screw being 3/16" in diameter, will locate the forming core to the frame so leave the 10 screw long enough to do that. Drill through the frame on each location penetrating the core block lightly. Then, after drilling and removing the frame, open the holes about 1/32nd" for any further flats to be drilled. The holes should not penetrate the core more than 1/8" deep, or so. In the event that more forming is done later, the holes will not interfere at all, nor weaken the core block.

Those who do not need the shop cluttered with unneccessary fixtures should procede to the side layout template and transfer the dimensions directly onto the blued up metal with a scriber tool. While the dimensions there are drafted as closely as possible, the print was not intended to be scaled. Builders are advised to transfer the dimensions with vernier calipers or on a surface plate using 'jo-blocks'.

The depth of the rule in a combination square can also be set with precision and scribe directly from the end of it as it is moved along each side, gaging from the bottom of the frame. This same process can be used from the square
filed front end to set the length dimensions of the trigger group holes. Great care must be taken to use a sharp 'prick' punch to set the hole locations. If necessary, use an optical visor, loupe, or magnifying glass to get the punch on location. The holes are then overstamped with a center punch ground to a wider angle. If the builder lacks an 'indexing' drill, a small drill near 1/16th, can be used to make pilot holes before carefully 'peck' drilling them through the metal to the required sizes. The dimensions to the hole centers is identical on each side, only the hole diameters varying.

The best way to place the holes in the sides of the frame without the drilling jig is in a milling machine. Notice that front is to the

right on the right piece, and to the left on the left piece. Zero on both pieces is located at front bottom. Measurements are 'up' and 'back'. (Or, height and length) Pay special interest to the pin sizes, especially if experienced in making the M-10 or M-11 some time ago. The rear stock block retaining pin used to be a cold rolled pin inserted with some difficulty. And the trigger pin was a stepped pin that stopped on the right inside wall, inserted from the left side, and locked like the sear/selector pin with the retaining wire. (Or, a 'C' clip in the SAP models that had the "semi-auto carraige" captivating thesear pin.)

Things have changed since Gen. Mitch Warbell ruled MAC. The stock block retainer pin is now 1/8th" in diameter and locks in place with a 'C' clip on the outside of the frame. The new trigger pin is 3/16" in diameter throughout and inserts through two like size holes. This new pin is an improvement over the old pin, and inserts from the right side. The trigger pin stops on the outside right wall. It now has a low profile rounded head like the stock block retainer pin and it still locks with the clever locking spring wire. Chances are, the guys working on the guns got tired of fighting the trigger spring just to get the locking wire in place. It is common to forget to start the locking wire (which must be in place under the trigger pin to lock it) before inserting the trigger pin. It was always remembered just after the fight to get the trigger spring and pin in place. So everything had to come out and be started again. See what you missed if your kit has the new pin? The new pin is also used in the semi-auto model, but is inserted from the left side in that gun. Some of the pins supplied are still the old design, so be familiar with the difference, as a different size hole in the right side will be necessary for the old pin. These differences are noted in the notes to the side layout templates. It is apparent that the old style pins were either manufactured for use in either the SMG or the semi, or modified for use in the semi, as they have a locking wire relief (ring) on both ends. When ordering a kit, some difficulty can be relieved by specifying that the 'new trigger pin' is desired in your kit. Unless the builder prefers the old style pin, which, having no head, is flush to the sides of a properly formed frame.

The sear/selector pin remains the same, and it is still a two step

pin with an amazing resemblance to the safety of the new M11/9 semi. The larger diameter is to the left, however, many of the sear/selector pins supplied have a weird right side dimension. It is supposed to be .281", but four out of four checked out .285", and that is common to nothing English, American. or metric. This can be easily resolved. Chuck up the selector/sear pin by the small diameter in any drill or mill, and spinning it at about 550 RPM, use a small, clean, fine cut file and dress it down to about .280". Take care to get it cleaned up all the way to the inside of the selector lever boss, which rides against the outside left surface, and keep the file parallel to the pin's surface. Another solution is to use a letter 'L' drill, which is .290" and will leave the pin a little sloppy, but the locking spring will take care of that. [For the benefit of those who may be confused by this drill name, in the machine business, there are three standard American groups of drills: "Fractional - Number - and, Letter". Any and all are commonly available at any professional tool supply house, or through one of the tool suppliers listed in the back of this book.] Dressing the pin down is the best option. Just don't be in a hurry. When you insert the selector/sear pin, if it doesn't fit right, check first to see if it is the 1/4" hole on the opposite side. And, remember why machinists love Mototool! More about fitting and tuning later.

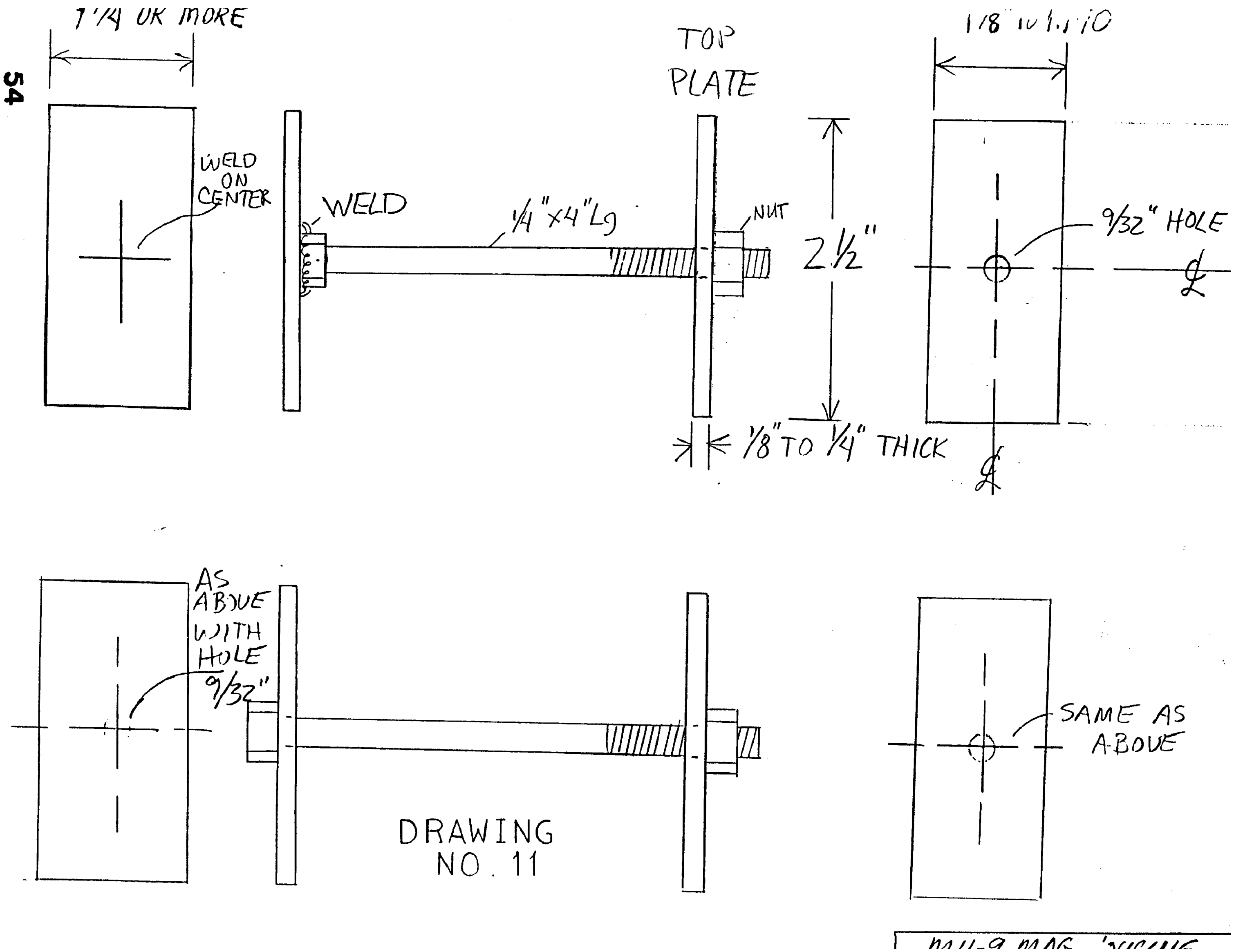
If the gun to be assembled is to be a semi-auto only gun, the holes dirilled in the formed flat will differ from the SMG, select-fire models. Consulting 'HOLE PLACEMENT FOR THE M11/9 SEMI' template, found on the back of the square tubing 'SECTIONING' print. Comparing this to the 'SIDE LAYOUT TEMPLATE', only the front connector pin holes and the trigger pin holes match the SMG trigger group template. It is also necessary to place the hammer pin hole to the rear as shown on that drawing. Since the semi-auto unit cannot use the stock assembly, the rearmost holes can be disregarded. The same regard for the 'old and new' types of trigger pins applies to the semi and SMG models.

If the flats being used are handmade, it will be necessary to put in the stock latch pin holes at the rear, if the stock is to be installed. Using '075" as the nominal flat thickness, the height is

.575" from the bottom of the frame. The distance from the back is not critical so long as it is around 7/8", or eyeball centered to the larger 7/16" hole of the three that comprise the stock mounting group. The height of the hole is the critical dimension. This pin is nothing more than a stop for the stock latch assembly. It's proper dimension is .880".

Deburr all holes drilled inside and out with a flat file or the Mototool and check the pins for fit and alignment of pins from hole to hole. Minor dressing of the front upper receiver connector pin holes will be done after the 'front tabs' are welded in place. It is really a waste of time until then. Misalignment is pretty common, but is seldom excessive.

The magazine wells of both the M11/9 and the M12/380 are diagrammed in the frame print on the back of the 'BASIC FLAT LAYOUT' print. The differences are obvious. Take care to notice that the position of the M11/9 and M12/380 trigger guard is identical. This position is critical to the proper function of the gun. It is also the only area in the entire relief in the bottom for the magazine, trigger guard and trigger clearance that is critical. The face of the relief that gages the forward position of the trigger guard is the most important. If the frame has been properly formed, and the inside dimension held close, the width of the outward shoulders on the trigger guard where it is formed for the chambering ramp will effectively hold it on center to it's proper position. The front face of the relief must be carefully measured, scribed and filed in place. If the face is a little wide, it is of no consequence, so long as it is kept centered, but it is still best held very close. Distances between the edge of the relief and the outsides of the frame should be frequently checked during the filing to keep them identical. Do not cut forward of the scribe line gaging that position of the guard. If the reader buys a bent center section, as is available from suppliers, and the rear is cut off just behind the rearmost stock block mounting hole, this can be used as a template to lay out the bottom of the frame. Care must still be used however, in cutting in the triggerguard relief.


WELD ON CENTER
WELD
1/4" x 4" Lg
TOP PLATE
NUT
2 1/2"
9/32" HOLE
1/8" TO 1/4" THICK
AS ABOVE WITH HOLE 9/32"
SAME AS ABOVE
DRAWING NO. 11

First, the entire relief areas are roughed in leaving them a little small in all directions. The trigger clearance slot can be cut to size, but left a little short. It doesn't have to be square, and can be left round if the roughing work is done on a mill. In this case, take it to size. A little over doesn't hurt.

The magazine well is best left undersized and cut to size after the magazine housing is welded in place. Just make enough room to work in it. Some prefer
to precisely cut it to shape and size and use a metal magazine to align the magazine housing for welding. Experience has not proved the value of this procedure. A simple jig for welding will be explained in chapter four.

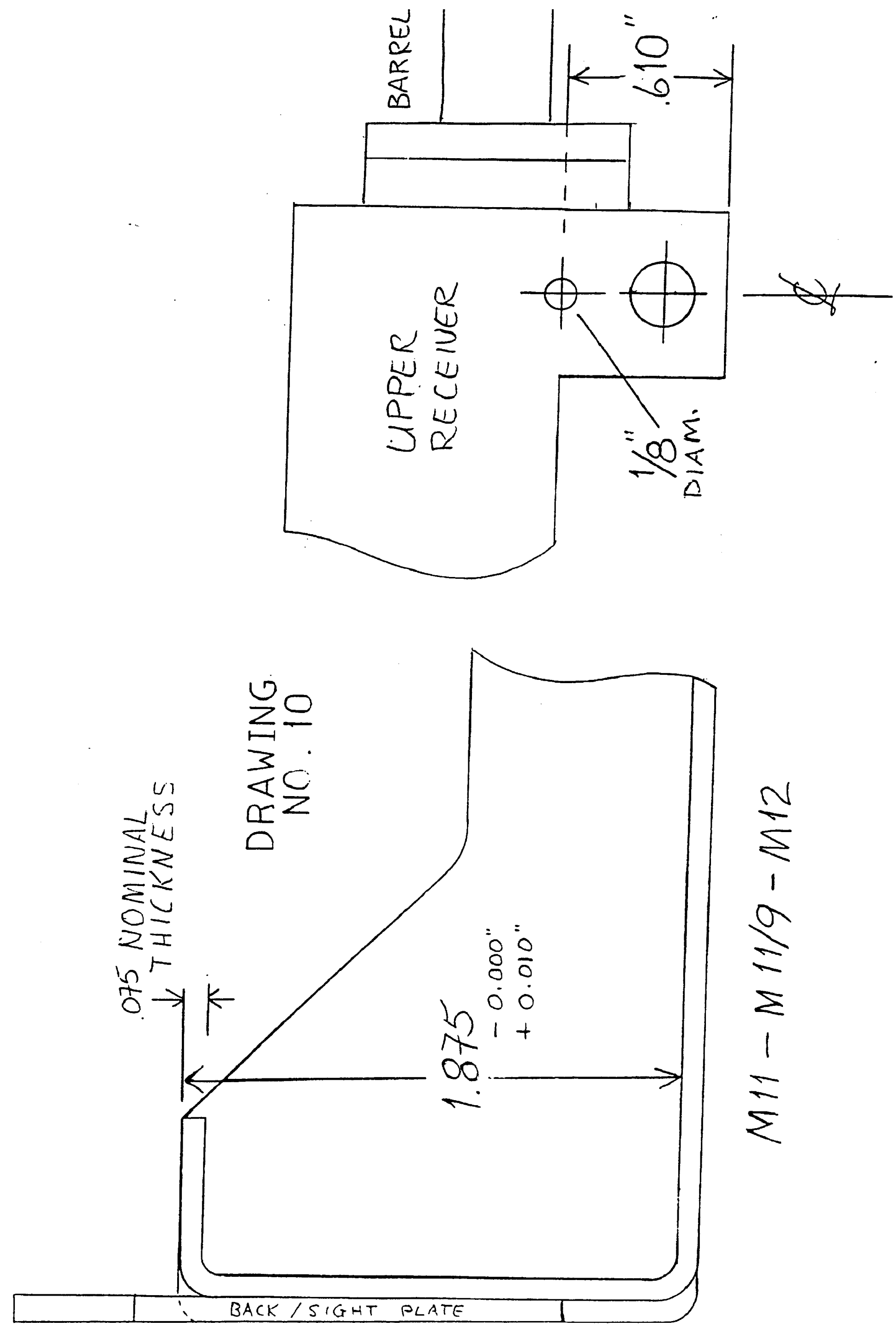
Assembly will detailed in chapter 5, with a few touch-ups to improve function.

CHAPTER THREE
THE CONSTRUCTION SEQUENCE

It may be best to first line up the construction sequence. It is arranged in 41 steps:

1. **Make flat**
2. **Drill locator holes: sear stud & front stock mounting hole, as well as the other two stock mounting holes, and the safety slot.**
3. **Form the frame channel**
4. **Deburr and correct rough areas**
5. **Drill trigger group holes**
6. **Weld front tabs inside frame**
7. **Weld sear stud in place**
8. **Weld sight plate in place**
9. **Grind weld areas clean**
10. **Layout bottom area for mag well, trigger guard, and trigger relief**
11. **Cut out bottom relief**
12. **File in trigger guard to fit**
13. **Assemble upper receiver to lower receiver with pin for primary fit**
14. **Check trigger guard to barrel alignment before welding**
15. **Tack weld trigger guard at frame inside bottom (after removal of upper)**
16. **Double check barrel to guard ramp alignment & make adjustments using the bolt and it's feed lip in the installed upper (again)**
17. **Weld trigger guard at front outside**
18. **Weld trigger guard inside frame behind side tabs near chambering ramp**
19. **Clamp magazine housing to frame. Check square and alignment to center line of frame.**
20. **Weld inside mag well at front, each side of the trigger guard down 1/2"**
21. **Weld behind mag well centered in mag well per sketch no. __ careful not to go beyond outside marks**

24. Check clearance in mag well for passage of magazine. Grind clear as necessary
25. Assemble upper receiver to lower with pin, and adjust upper rear if necessary before welding
26. Weld upper rear on each side top
27. Grind upper rear welds clean
28. Clean up weld on front of trigger guard
29. File off any remaining burrs, and cut in the wire relief at inside left top of trigger guard, tight against the inside wall.
30. Prepare for metal finishing (sand paper, sand blast, etc.)
31. Finsh metal
32. Polish top of disconnector and bottom of sear catch areas
33. Assemble trigger group and mag catch grip assembly
34. Stone & polish extractor, bolt feed lip, and the radius surrounding the bolt face
35. Assemble bolt assembly/recoil spring, guide rod, ejector rod, and ejector
36. -Optional- Weld firing pin into fixed position
37. Drill barrel retainer pin hole with barrel installed in upper receiver and install retainer pin
38. Assemble upper receiver ass'y and install in lower receiver
39. Check for function flaws in both modes of firing and correct problems
40. Test fire
41. Fear no evil!


DRAWING NO. 10
M11 – M11/9 – M12
BARREL
.610"
UPPER RECEIVER
1/8" DIAM.
.075 NOMINAL THICKNESS
1.875 – 0.000" + 0.010"
BACK / SIGHT PLATE

CHAPTER FOUR
WELDING IN COMPONENTS

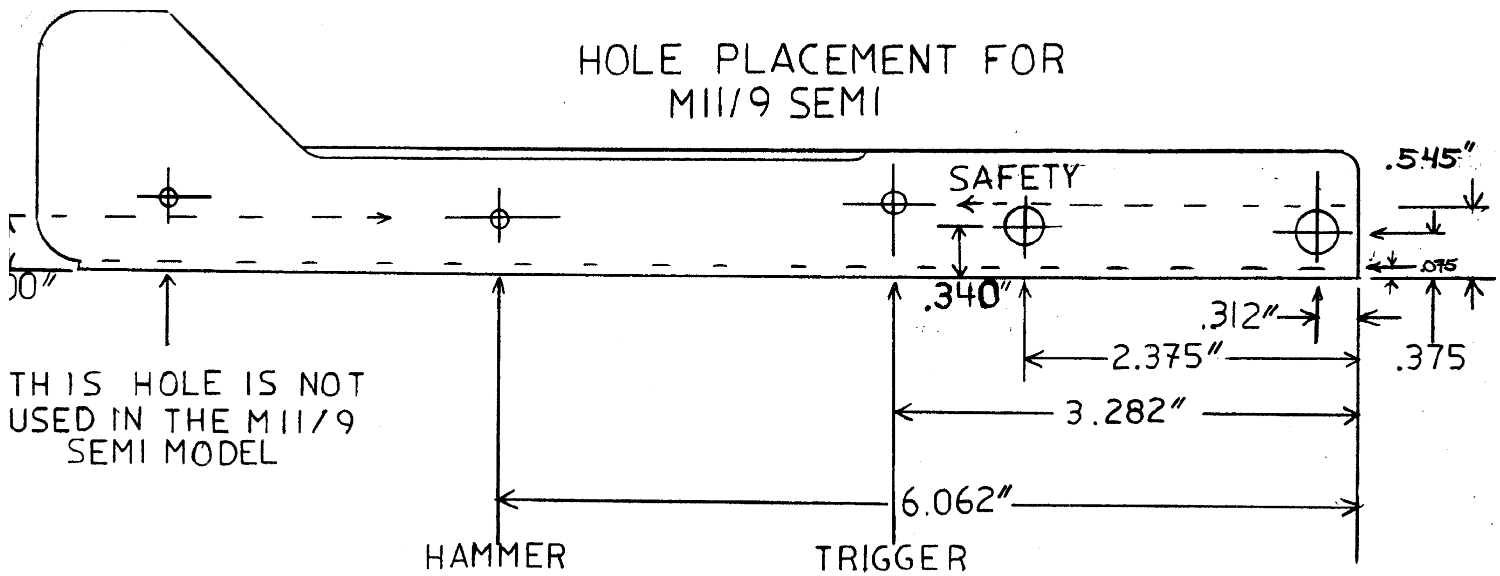
Do not be in a hurry to assemble the lower receiver. It must be done in a particular order to avoid complications. For example, if the trigger guard and magazine well are welded into place before the trigger group holes are drilled, it is more of a hassle to hold the frame, lay out the holes, and the drilling fixture cannot be used. Most importantly however, is to remember not to weld the upper rear top welds before checking the fit of the upper receiver assembly with complete bolt assembly to the lower with the trigger guard and magazine housing welded in.

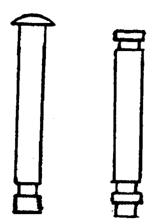
REMEMBER THROUGHOUT THE WELDING STEPS THAT EXCESS HEAT WARPS !!!

The stock assembly is relatively simple: the stock block is welded into place in the holes provided in the rear of the frame where the pins protrude on the bottom. It would be prudent to use the stock rail section in the frame, with the block in place prior to welding to be certain that the block will be centered in the frame. In the event that the rails bind, check first to see if there is free movement of the rail section of the stock without the block in place. Should the rail section bind only with the block in place, elongate the 1/4" holes slightly to each side til the rails move freely. In this case, also *use the rail section to position the block* during welding. It is held for welding by clamping or wedging, and after cleaning up the welds, the latch is assembled and the retainer pin placed and locked. The stock assembly is inserted in the frame and checked for free movement, and both rail holes and stock rails are ground or filed for necessary clearance.

So, there is a sequencial order that must be followed. No doubt, the over anxious will get the opportunity to re-read and re-do a lot of the preceeding instructions! Experience is what you get when you don't get what you wanted. Everyone can get what they want the first time out if they will exercise patience and follow instructions.

HOLE PLACEMENT FOR M11/9 SEMI





NOTES ON TRIGGER HOLES:
RIGHT SIDE IS VARIABLE:
OLD STYLE IS .156"=5/32"
NEW PIN IS .187 = 3/16"
LEFT SIDE REMAINS .187"=3/16"

NOTES ON SAFETY HOLES:
LEFT SIDE DIAM: .250"
RIGHT SIDE DIAM: .290"
>SAME LOCATION APPLIES
>TO BOTH SIDES.

The components of the basic lower reciever are as follows:

The formed frame
The front tabs
The sear stud
The trigger guard
The magazine well

After the trigger group holes are drilled and deburred, the front tabs are placed inside the frame taking care to keep the upward notches to the rear. Do not clamp this peice, but hold it in place with a piece of 5/16" round stock such as a dowel pin or drill. The original connector pin is not advised to be used because the heat of the weld may damage the spring under the locking ball in the pin. The factory method is to weld the top area of the bends of the tabs. Often, one side of the tabs will appear to angle away from the frame side. In this case, weld just the one laying flat to the side, and then with the alignment pin still in place, use a pair of vise grips to squeeze the errant side to the frame, and thus held, weld that side also. If welding at the 'U' formed front edge, weld it all as one continuous weld. The thinness of the metal is difficult to weld with stick arc welders, even for the advanced welder. Therefore, the egde welding is only advised to the users of heliarc. If the builder is unfamiliar with sheet metal welding, a little practice on some scrap is advised prior to the actual welding of the frame. The simplest and quickest attachment is to weld the top of the tab sides only. It is not necessary to weld up the area along the front face of the frame to close the gap between the front tabs and the frame, but it makes a much nicer appearance, welded and ground clean.

The sear stud is next and it is best clamped in place with a pair of vise grips taking care to keep the front of the jaw on the outside bottom clear of the stud sticking out of the hole. Of course, once tacked, the vise grips can be removed to finish the weld. Just be certain that it is flat and square to the clean deburred hole before welding. Advise is hereby given to the wary: with the tremendous demand for the parts kits, mistakes do happen in packaging. Occasionally, a Model 10 part may appear in the trigger group parts. All of these are obvious but

the sear stud. If your parts kit contains the model 10 stud, it will have a 1/4" welding stud instead of the 3/16" of the M11/9 and M12/380. The first impulse may be to simply open the hole to 1/4" and weld it in. Please note that the thickness of the base, that distances the contact surface of the sear to the bolt, is thicker by .050" than the M11/9 sear stud. If used as is, this could prevent engagement of the sear with the bolt, resulting in a "runaway gun" phenomenon like that described earlier with the fixed full auto firing pin in the semi-auto gun. Either chuck it up in a lathe or drill press and turn it to the proper dimensions, return it for an exchange, or trade it off at the next gun show for what you need. Do not use this part in the M11/9 as is!

Now, grind the areas inside the front tabs clean for fit to the upper receiver, and the sear stud weld clean for appearance.

Place the rear sight plate (also called the "backing plate") in position over the area of the rear tab containing the two holes for the two pins of the bolt assembly and clamp in position with a small block of metal or wood placed inside the frame. Clamp on this block to hold the sight plate in position, or stand the frame back end up in a vise and lay the plate down in the width allowed for it. Measure from the top of the sight plate down to the top of the frame approximately .500". Tack at one upper corner and the opposite bottom corner. Weld only the cut areas of the sides of this plate, carefully filling them up. Grind this weld clean and mildly radius the sides. Only in the event the stock kit will be used will any consideration for the bottom clearance of the plate be given.

In all of these welds, avoid overwelding. Experienced welders know to use weld sparingly on such thin metal. Broad area coverage tends to cause a contraction that warps the metal and these distortions can change the relationship in the dimensions of parts to each other enough to create binding that is just more work to fit in. The only obvious exception here is the sight plate at the back. With all of the afore mentioned finished, place the trigger guard in the frame and check the square and center of it to the frame. If the guard area outside the frame surrounding the trigger is out of square, it is of little concern but for appearance.

INSIDE the frame is another thing entirely! Since the wide tabs of the inside position it in the width, one need only be concerned with keeping the bottom shoulders to each side and below the feed ramp <u>flat to the bottom</u> and properly dimensioned to the front of the frame. This position directly affects how well the gun will chamber and is the reason for all the concern in cutting the relief for the trigger guard, and the fitting of it to the barreled upper reciever. (Be certain that the barrel is tightened well into the breech block of the upper reciever housing before using it as a gauge.) Be sure that the relieved areas have been thoroughly deburred, and check the stamping of the trigger guard for any residual burrs. Remove any burrs encountered.

Aside from making a sophistocated block to hold the trigger guard in place, consider a spot or two of super glue instead. The welding required will have enough intense heat to burn the glue away. It is cheaper, and it's sure faster. Use a drop at each side of the chambering ramp area and at the outside front where the trigger guard begins in front of the trigger. Thus positioned, tack weld each side at the bottom behind the trigger and inside the mag well, filling up any overcut. If the trigger guard stamping was clean and to dimension, the width of the tabs at the chambering ramp should be holding the guard on center in the frame. Should the guard be accidentally glued out of position, a little acetone solvent (super glue remover) will dissolve the glue. So will a little heat, but don't use both unless you have a death wish!

**With the inside bottom tacked, weld the front of the guard in place across the
width of the guard taking care to break clean from the edges to avoid burn out. Then, go to the inside of the frame again and tack weld behind the tabs mounted in the gun. Fill the angled cut to each side but do not run into the area under the tabs, as that is where the stock rails must slide.**

With the upper receiver in place in the lower receiver, slip the connecting pin through the holes. Have before you the drawing number 10. If resistance is encountered, bend the upper rear, first tab bend area of the frame ever so slightly to allow the pin

to move freely through the assembly. A small crescent wrench works well for this. Using a nominal flat thickness of .075", and measuring from the top of the bend down to the inside bottom with a depth mike or vernier calipers, the measurement should be 1.875". This should be a minimum, but unless the flat is thicker than .075" it should not exceed 1.900". Thus established, weld the top two sides and grind those welds clean.

Clean up the area to each side at the front of the mag well behind the guard so that the magazine housing will clamp squarely to the bottom of the frame, and fit tightly to the back of the guard. The M12/380 magazine housing is a rectangular affair, and centering is simple: clamp in place to eyeball and then measure each side to the outside til both measure the same. The M11/9 is a little more tricky. The center of the front of the housing must be centered to the guard to hold the mag in proper position to feed. This is the reason for the hassle of fitting the guard to the upper reciever barrel before welding. Be sure to place the housing with the magazine catch holding tabs away from the frame and to the rear. Ideally, the housing will be centered to the trigger guard, hich in turn, will be centered to the barrel. So, measure the outside front corners of the housing to the outside edges of the guard. That done, double check the center of the housing to the frame outside edges both at the front and the back of it, and lay a straight edge along the side of the frame on each side to be certain the mag well is in a straight parallel line to the straight edge. If necessary, shim the housing so it is square to the frame. That done, place the weld behind the magazine housing as shown in the 'WELD-UP AND MAG WELL' print. Use care to leave about 1/4" unwelded on each side of this weld. If this is not done, then either the weld or the grip will have to be trimmed for the required fit. Weld the front of the housing to the trigger guard at each side, down from the frame about one half inch. This is the factory method, and it is a job for experienced welders judging from how fine it is. Under no circumstances weld the outsides of the housing at the top of it to the bottom of the frame! Such a weld will make the frame warp so badly that all of the work done will be useless. The welding advised will render a solid, clean looking unit capable of extended use and abuse. If the builder does not like the

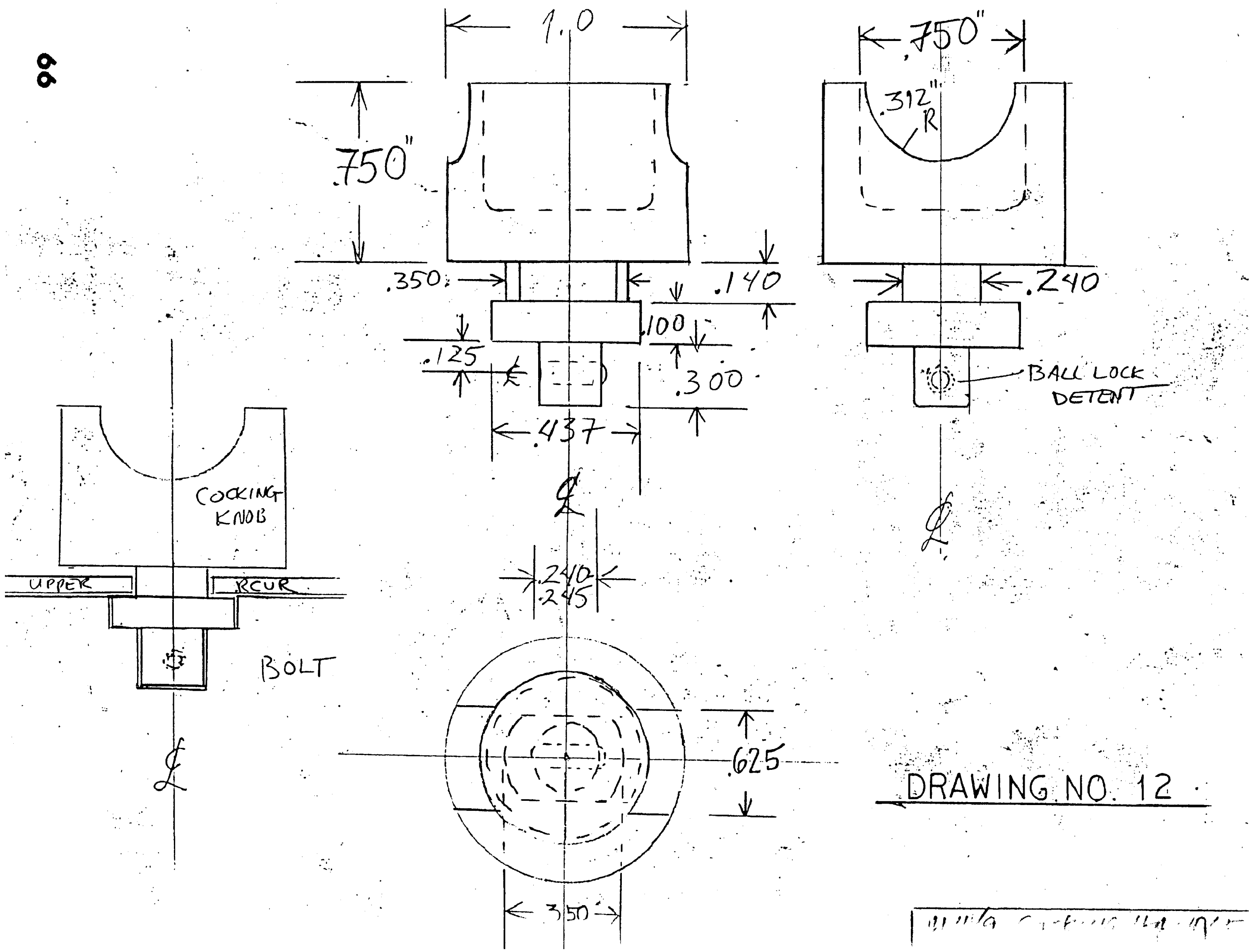
appearance of the two vertical welds at the front of the housing to the trigger guard, a single weld inside the frame across the top of the housing to the back of the trigger guard will work as well and leave a cleaner appearance.

Shown in sketch number 11, is a dandy little jig that will hold your mag housing to the frame well for easy positioning and welding. Either two pieces of metal can be drilled for passage of the bolt, or one of the metal plates can be welded to the bolt head. A wing nut is much handier than the standard nut. The inside plate needn't be a snug fit, just long enough to span the mag well, front to back.

After welding, check the housing with a magazine for clearance, and grind any
necessary areas for it's proper fit. If the mag well area was intentionally left small, it is now very easily cut in now using the inside wall of the housing as a gauge to size the opening. A 1/8th" cylindrical carbide cutter in the mototool works beautiful for this, but don't lean on it heavily. Use light strokes in the direction the tool pulls (climbing cut) to remove the metal.

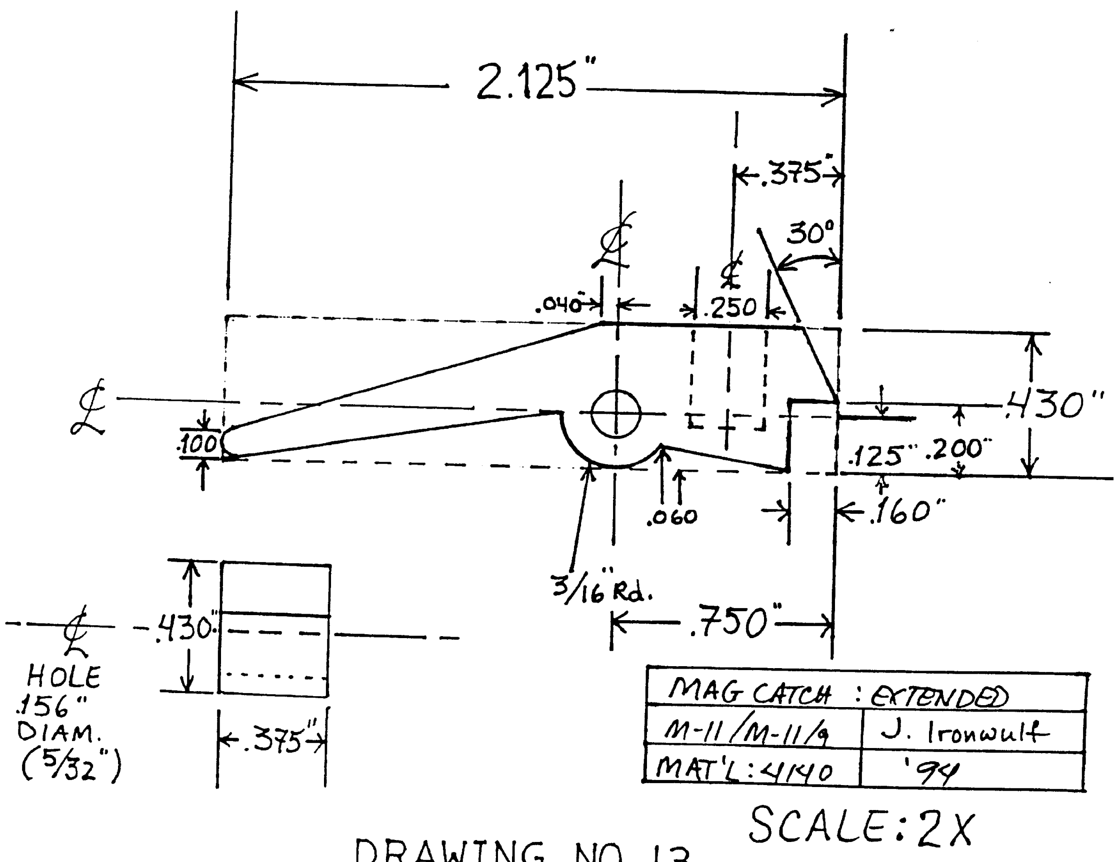
The remaining parts to the frame are the stock kit. It is composed of these
parts:

The stock block
The stock latch
The stock latch pin
The stock latch plunger
The plunger spring
The stock rails
The wire stock butt
The stock hinge pin and clip



DRAWING NO. 12

change at the magazine well of most popular pistols, beveling the mag well opening for easier and thus, quicker magazine insertion. Drawing number 13 details this component.



DRAWING NO. 13

However, it is only the stock block that is of importance right now. It must be welded into the frame. It must only go in one way, with the protruding stems fitting through the 1/4" holes in the frame bottom and it's highest side to the rear. Usually there is enough metal protruding that using the heliarc welding system, no metal rod is even necessary. Just wedge the block in place with a small piece of wood, and make two quick circular passes on the stems. Grind clean. Be certain that this block is the last piece welded into the frame assembly.

The safety assembly was not mentioned because there is nothing to weld in that group. It will be discussed in the next chapter. All that remains now is to assemble and fit out all of the parts, and make the minor corrections. So, let's put it together for the first time!

CHAPTER FIVE
ASSEMBLY AND FITTING

The first assembly covered is the semi-auto gun. Instead of the sear stud welded into the front center hole, the bent piece of metal with it's tab protruding to the rear and right may be welded in place, or not. It is just extra weight. The sear of the semi unit is that forked yoke thing that fits under the trigger guard 'wings' from the rear against the block that rides in the front recesses of the fork and against the back of the trigger. All of this is held in place by one 3/8" diameter spring in the back of the frame, housed in that sheet metal 'U' shaped clip that lays in the bottom back of the frame. The hammer and it's spring are pretty obvious even to the inexperienced, and those peices pinned in, hold the sear yoke downward. All of the components from the sear yoke to the trigger are kept in place by the tension of the rear spring. The safety goes in from the right side, and is locked in place by the locking wire, which also locks the trigger and which in the semi unit is in the *right side* of the gun, as the trigger pin inserts from the left, regardless whether old or new style, but be mindful of the style of pin *before* drilling the right side hole, just as needs to be done in the select-fire model. The hammer pin locks with a 'C' clip on the outside of the frame, and doesn't care which side. The description given may be difficult for readers to understand. especially if the kits recieved look anything like the six ordered by one of the writers. NONE of them contained a complete parts set for construction of the semi trigger group, and of all six there was ONE sear/yoke assembly, and even it wasn't a complete unit ! Everything described was learned from the disassembly of a store bought M11/9 semi-automatic ! I think everyone at MAC shipping figures everyone is building SMGs. So o o o o o o,

Most of the users and builders find no use for the stock kit but extra weight. In fact, they may only have it because they had to buy it to get the SMG parts they wanted. If the stock will be installed, fitting and assembly will be covered last in this chapter, along with the safety assembly, which also is usually ignored. One small variation is detailed that could save someone's life. This is a modified cocking knob that will serve

as the only really useful safety. This will be explained later.

Assembly begins with the upper receiver mounted in the new lower receiver. Check first to see that the inside upper rear of the frame receives the rear of the upper receiver. Ideally, the fit should be as close on the top as both sides. Then press the upper down at the front to check the pin alignment. The connector pin should slip in and out with little more than finger pressure, and hopefully, any resistance is nothing more than a stiff locking ball in the connector pin. Should this be suspect, use a 5/16" dowel pin, or a smoothe metal rod that measures .312". If no resistance is encountered, It is just the locking ball of the connector pin. However, it may be necessary to double check the bottom to top dimension at the rear of the frame. The reason for making the top welds last (next to the stock latch block) is to be sure that the dimension in the sketch number 10 is correct. If there is a problem with the front connecting pin passing through the upper receiver, check first to be certain that the holes are not misaligned. A 5/16" reamer is the quickest method of fixing that problem. But even then, it may be a little tight. In this event, use the mototool or the 1/4" round chainsaw file, and lightly stroke the holes in the frame for fit.

When stroking the top of the connector holes, do not exceed .320" inside dimension, measured vertically. It is best not to exceed .315". If a white magic marker or felt tip paint marker is used on the bottom area for about 1/2" to each side of the location where the upper reciever touches the guard wings, it will be simple to see how hard it is hitting. It is also possible to get a little play by lighty filing the inside top of the rear of the frame. Due to the large area here however, it is advised that very little be removed at this location. As last resort, the trigger guard wings on either side of the chambering ramp can be filed down a *little*. This is not an advised practice unless it becomes obvious that the guard was welded in place with the bottom shoulders not fully down against the inside bottom of the frame. Changing the distance from the bottom of the magazine housing to the bottom of the bolt feed lips is not advised, and cutting the top of the trigger guard wings is doing just that. What will result is the bolt striking the lips of the magazine, and repairing this by

cutting the top of the magazine catch may lead to a failure to feed due to the lower angle of attack of the cartridge to the feed ramp.*Good magazines should not be altered except in an emergency condition!* If the trigger group holes were placed to print, the trigger guard was welded in properly, and the rear heighth is correct after weld, the only logical problem that could exist is the frame being warped. Sight down the bottom corners of each side or use a straight edge to determine this. Otherwise, there should be no problem.

Throughout the fitting, precision relies largely on the eyes of the builder. One useful trick in the machining industry is to white out dark metal and darken (blue) shiny metal. Then, using the straight edge of a mint condition machinist's scale (a six inch flexible metal ruler) or the edge of a precision square or rigid ruler, sight across the metal for low or high spots ("humps" and "holes"). In the event that the front edge of the top of the rear of the frame bends down slightly, a great deal of the fitting problem discussed so far may be eliminated by lightly filing here. If it is flat, leave it alone and adjust from the front connector pin holes and *if necessary*, the guard wings.

**Now, assemble the trigger group parts starting with the trigger cluster. This consists of the trigger, the disconnector, the disconnector pin, the trigger spring and the trigger pin. Before assembling the trigger cluster polish the upper curved surface of the disconnector with a fine file and 240 emery paper.
It should be a slick shiny finish.**

Assemble the disconnector to the trigger with the trip bar of the disconnector to the left side of the frame. The trip bar is the round pin that protrudes to one side of the disconnector. It is engaged by the trip when the trip is struck by the forward moving bolt at it's frontmost movement in the semi-automatic mode. Removal of the trip from the trigger group assembly will result in the gun functioning in the full auto only mode. The assembly of the disconnector to the trigger is most easily accomplished using a bench vise, vise grips, or 'C' clamp to press the disconnector pin in place. It should be pressed into place since hammer tapping could break one ear of the yoke that

holds the disconnector.

Place the trigger spring over the trigger, but do not attempt to lock the hooks of the trigger spring into position before the pin is in place. If the kit has the old pin, the reciever holes should be 3/16" (.188") in the left side of the frame, and 5/32" (.156") in the right side of the frame. This pin enters from the left and it must be remembered to place the locking wire in position under it before continuing. This is a good place to cut a small relief in the weld of the left tab wing, tight against the frame wall for the wire. It must be as deep as the diameter of the wire so that it will not interfere with the lay of the upper receiver when in place. A small triangular file or edge cutting file works well for this, but nothing is as nice as the separating disc mounted on proper mandrel for the mototool. The separating discs are Dremel part number 409, and come in a small, round plastic containers of three dozen. They are very fragile and must be used with that in mind. Break a couple, and you'll get the idea! Gunsmiths love these little guys as they have a great many uses.

If the reader has some experience with project building, this text is just being read now, and construction has not yet begun. So - depending upon the particular welding skill of the craftsman, the weld in the left side tab wing of the trigger guard can yet be placed to leave the necessary space for the locking wire. In the factory guns these two welds are mere dot tacks made by welders with a lot of experience. The wire must fit tightly against the inside wall, and may need to be bent from it's original shape to properly fit and lock. When all of the trigger group parts are in place, it should be tight. With the old style trigger pin, if the builder forgets the locking wire assembling the trigger, it will be necessary to disassemble all that has been done to properly place it.

If the kit being assembled has the new trigger pin, the frame holes will both be 3/16" (.188"), and the pin will enter from the right side of the frame. In this case, the locking wire is the last thing encountered before positioning the trigger spring hooks. So, either way, get the wire in place and the pin through the trigger spring loops and trigger and pressed completely in

place. The same trick with a very small grinding stone on a 1/8" mandrel in the mototool can be carefully applied to each hole as necessary to fit the pins in place. Remember though, that it is better to have a tight fit, so the best method of fitting holes is to use the appropriate reamer followed by a rolled up piece of 240 or 320 grit paper stroked in and out of the hole for a clean slide of the pin. Often, just a minor difference in the hole position can make life difficult during assembly. At the trigger holes, with the new pin, it is a simple matter to run a drill through both holes at once to align them. The 5/16" reamer does the job best on the front connector pin holes.

If the safety assembly will be used, it should be put in before the trigger group parts are in place, as it sets directly under the sear. The body of the sear block has a small hole for the locking ball & spring. Insert the spring, and then the ball, and turn the frame upside down and push the small protruding tab with the hole in it through the slot. Be certain the locking ball end of the block is to the rear of the frame. Hold it in this position and place the safety button over the tab outside the frame and press the roll pin through it, catching the tab and the assembly is complete!

Of the two wire fingers extending out from the trigger spring, one has a straight length with a small bend in the end. Using a medium sized flat tip screwdriver, push this bent tip down under the trigger. See that it locks there. The other wire is the disconnector spring section of the trigger spring. It fits under the trip bar of the disconnector. The trigger is now properly installed.

The remainder of the trigger group is the trip, sear, sear spring, and selector/ sear pin. Begin with the selector/sear pin from the left side and slide it under the locking wire and through the trip. At this point, hold the frame pointed down, and insert the forked end of the sear with the spring in the spring well over the sear stud, and press the sear and spring down into the reciever, holding it with the thumb while the sear/selector pin is pushed through the sear. Carefully wiggle the selector lever back and forth while lifting the locking wire to get the pin fully into place.

Unfortunately, it must be noted that most of the trips out of ten purchased had to have the sear pin hole opened with the mototool for the pin to pass. Looking back, it is best advised that care is taken to open the hole at the top of it to minimize binding. With this assembly completed, release the locking wire and check for tension. It should be tight. If not, it is usually easiest to bend the end over the trigger guard wing, but alas! it may only be accomplished removed from the frame!

The stock kit is a simple affair, and I'll try not to insult your intelligence with my explanation. The 'T' shaped piece with a round protrusion (that is the stock latch button) has a spring well in the middle of it. Drop the spring into it, and top the spring with the stepped plug. Now, with the stock latching block welded into the frame, place this assembly in the block so the round stem drops down. Now, pressing the plug and spring down, insert the locking pin from either side and through the frame and snap the 'C' clip over the outside end. It may be necessary to tap the pin to get the head fush with the side. All that is left is to press up on the protruding button on the bottom, and slip the stock rail into the frame with the notch up. Attach the folding butt of the stock to the rail assembly with the pin and 'C' clip , long loop up, and *hey*! it's done! If the button will not depress far enough for the stock rails to pass, you have the wrong spring in there.

Last, it is necessary to assemble the bolt group. This group consists of the bolt, the recoil spring, guide rod, and rod pin. the ejector rod, the cocking handle, a square plastic piece called a 'button', the recoil guide plate, the ejector, it's spring and retainer pin, and the firing pin and retainer pin. In the M11/9, the firing pin is available as a semi-auto pin for the closed bolt model, and as a fixed pin for the SMG. It is the same pin, but the semi version has an elongated slot to allow it to move when struck by the hammer in the gun with the bolt closed on the cartridge. The full-auto 'fixed firing pin' simply has a hole in the middle that is locked by the same cross pin.

The extractor is the next important component. The extractors supplied with the kits are really not finished. They need to be

cleaned on each of their sides til they are flat and slick. They can be filed flat first, or stoned with something like a course sharpening stone, but it should be flat. Norton, Gesswein, and Congress all have a line of stones for polishing that are excellent for this work. Enco Mfg. (see the supplier list in the back) has a nice set of six various shapes for about six bucks. MSC Industrial Supply Co. has a full line of Norton and Behr-Manning stones. However, a sheet of 180 or 240 grit emery paper glued up on a flat board or piece of metal is quick, cheap and easy for such things as polishing out small flat surfaces. (It's still a good excuse to buy a nice assortment of polishing stones!)

With the sides of the extractor flat and smoothe, stone and polish the radial surface that the cartridge will strike when chambering. Then turn the extractor over and very carefully clean the area under the extractor lip, and stone or otherwise polish this area keeping the lip square. The separating disc referred to earlier is great for this, but really be careful to *just touch* the surface of the metal a little at a time. If the extractor can be held in a bench vise or the like, it will likely reduce error. If the spring well is polished it will prevent the spring from dragging against the rough surface as it moves. A close look at the extractor spring will reveal that it is trumpet shaped. The small end goes in the spring well of the extractor.

Installing the extractor is made easier with the aid of a small cheap 2" 'C' clamp. This is used to hold the extractor in compressed position while the retainer pin is driven or pressed in place. This too, is made easier with the aid of a 3/32" pin with the end rounded. This is pushed through the bolt body and the compressed extractor from the top and the clamp removed. The retainer pin is then driven through the hole from the bottom, pushing the temporary pin out as it slips into place. With the extractor and spring in place, compressed by the clamp, one should be able to see the hole in the extractor in line with the bolt body. Uusually, a light tap at the front will bring it into alignment for pinning.

The firing pin will need some consideration. If, for instance, the

builder is constructing a selective fire lower that will use the semi-auto upper assembly
of an existing gun (or the semi kit), a simple modification to the front right bottom corner of the bolt will make it functional in both the closed bolt and open bolt unit. Look at drawing number 11, and cut the notch in this corner of the bolt, approximately 3/16ths" by 3/16ths". The purchase of the full auto firing pin solves that problem, as it will interchange with the semi-auto firing pin and the bolt assembly will be functional in both units. Once again be warned that *the full auto firing pin must be replaced with the semi-auto firing pin* for use in the semi only reciever.

Builders of the open bolt SMG unit from the semi kits will need the M11 or M11/9 SMG trigger group parts to create a selective fire gun. The firing pin in the semi kit can simply be welded in place at the back, and the weld cleaned up. It doesn't require but a tack to hold it. Be certain that it is fully forward before welding. The protrusion should measure a minimum of .050", and a maximum of .080", which is a bit excessive for really hot ammo. Tell tale markings on the primers can be reduced by replacing the firing pin with a 3/32" diameter piece of alloy rod like an ejector pin from a plasitcs mold or music wire. Welded in place carefully, a drill will work, but it is not advised, since it is a brittle metal.

The recoil spring, guide rod, and ejector assembly are put together beginning with the recoil guide plate and the plastic 'button'. Holding them out and looking at them, have the holes to the left and run the longer, larger pin through the upper holes, the metal plate first, and then the plastic, and then the same rod through the recoil spring, and this assembly through the upper left hole in the back of the bolt. Now, press the bolt down against the recoil spring on a hard surface like a work bench or desk til the tip of the rod comes through the front of the bolt, exposing the small hole in the end. Use a pair of vise grips or the like, and clamp onto a section of leather belt to secure the rod while the 1/16th" retainer pin is tapped through the hole til an equal amount of the roll pin extends out of each side from the recoil pin. If assembling the SMG kit there will be *two* 1/16th"

pins, one slightly longer than the other. Use the shorter of the two. The longer one is for the safety button. Release the clamp and insert the ejector rod through the remaining hole and into the bolt. Clamping directly on the rod itself will scar it, and those marks must be removed to assure smoothe function. One of the excellent little 2" or 3" vises that clamp onto the edge of a table, available from a local Tru-Value or Sears store, with an aluminum metal cover made to slip over the jaws, is excellent for this and many projects to reduce scarring.

Now, check the movement of the bolt to the recoil spring and rod. If there is any resistance, compress the recoil spring completely and look for rough spots on the recoil rod or the ejector rod. Also, check for either or both of those rods being bent.

The barrel is pinned into the upper receiver by first tightening it into the breech block. Grip the barrel firmly, but not excessively by the barrel in a vise with the barrel wrapped in a piece of leather belt or soft metal like aluminum and tighten the receiver down *carefully* with a 'cresent' wrench. Carefully locate a mark on one side or the other, centered on the width of the breech block in the upper receiver, just above the 5/16" hole, .610" up from the very bottom of the breech block as shown in drawing number 10. It is *critical* that the 1/8" hole be drilled at a perfect right angle through the block. If care is not used, the hole may cut through the bore of the barrel, rendering it useless! Using care and 'peck drilling' the hole, there should be no problem.

With everything in working order, insert the completed bolt assembly into the upper receiver, and don't forget the cocking knob! With the lower assembled, attach the upper to the lower with the connector pin. Put the magazine catch in between the wings at the bottom of the magazine housing and slip the retainer pin in place. Press the spring into the well hole in the catch and snap the plastic grip over the screw boss and catch assembly. Insert and tighten the grip screw. Now a magazine may be inserted for the moment of truth, and the bolt cocked. Pull the trigger and the bolt should slam shut. If you hold the cocking knob and pull the trigger, letting the bolt go forward

under control of your hand, don't be surprised if it sticks when it contacts the magazine cartridge follower. It is meant to drive forward under the full force of the compressed recoil spring.

With everything functioning, go out and burn up a month's salary worth of ammo and come on back and we'll discuss "Finishing the Metal" in chapter 6.

A couple of extras were promised, and these are they:
Let's begin with the safety mentioned earlier. It needs some explanation.

The older Model 10 Ingrams had a cure built into them to prevent "slam firing". A solution to this inherent problem in openbolt SMGs has been attempted in almost all guns of this design. The Uzi may have the most sophistocated remedy with it's racheting cocking system plate. The bolt is only released from the restraint of the rachet plate when it is rearward enough to be engaged by the sear. The Model 10s had a design of the cocking knob which when turned 90 degrees would lock the bolt in the forward position. This presents a whole different set of objections for active use in the field, but the "slam fire" liability of MAC to the end user was resolved. It was especially handy to paratroopers carrying the weapon as a back up, as landing in a parachute is usually rough, and who wants an unnecessary extra shot fired.

This dandy design can be adapted to the M11/9 and M12/380, but it requires a steel will, as it is simple, but tedious! In the original M-10, the detent spring and locking ball is in the bolt, and the locking grooves are in the stem of the cocking knob. Since the treated bolt is semi-hard, it may be easier to place the tiny spring and ball in the stem of the knob, and cut the grooves vertically into
the hole in the bolt for the knob stem. Drawing number 12 details this assembly.

The second modification promised is a very handy extended magazine release. It is a more sophistocated evolution of the improvisation made by drilling and tapping a hole into the

bottom, flat surface of the magazine catch supplied with the gun, and adding a one and a half inch screw. The stem of the catch sticks downward and lays close to the back of the magazine. It *does* make the opportunity to release a loaded magazine a *little* more likely. A user must learn to be aware of it. However, in actual use, it has proven itself a thousand times better than that cursed little nub one can never find under extreme stress! One little informative tidbit to add here is that statistics show that death in the line of duty is far and away more often caused by exhaustion of ammo, and time changing magazines. This realization has led to the factory change at the magazine well of most popular pistols, beveling the mag well opening for easier and thus, quicker magazine insertion. Drawing number 13 details this component.

CHAPTER SIX
FINISHING THE METAL

This chapter is divided into three areas:

1. Painting
2. Zinc Phosphate/Black Manganese
3. Teflon

In every one of the methods presented, it is recomended that the base metal of the frame and the upper reciever be sand blasted first to remove all rust and scale. In the event that the finish will be paint, & if the upper reciever has a decent factory finish, the builder may elect to just clean it good in a chemical that will remove the oils in the metal. Whether the barrel is removed or not is a matter of choice. If parkerizing with the barrel in place, plug each end with modeler's clay or silicone sealant. If painting, toilet paper plugs work fine and inexpensively.

Many paints available will match the original upper reciever finish. The builder will have to experiment til satisfaction is achieved. The brand name 'Krylon' makes a 'BarBQue Black' that is tough and dead black, but experiment for satisfaction. The nice thing about enamels is that they can be changed with a little solvent and time. Ready access to a sand blaster makes every type of finish a breeze to change.

Painting with the barrel in place, everyone is advised to mask the front of the barrel if the upper reciever is painted. If the threaded area is used, the paint is history, and the finish will look shabby. If an accessory will remain on the barrel, it won't matter.

Parkerizing the frame requires a bit of consideration. Sand blasting is not absolutely required, but is a pre-finish of choice. If not blasted, be sure to hand sand off all rust and scale. Finishing with a hand stone of say, 150 or 220 grit will be nice, but keep all of the stone marks in the same direction when finishing. This is a LOT more work than necessary, as sand blasting is so simple. Remember that most of the finish you

create will be visible through the parkerized treatment.

MAC offers a "Pre-Black" solution for about $35.00 that at first clance, appears to be a rip off. The package contains a plastic bottle with about a half pint of contents! This will however, make about thirty gallons of brew! A note of warning though: This solution, once made up, has a very short life cycle. It would be surprising if it was good fourty-eight hours after it is mixed. It is not necessary to mix it all up at once. Just divide down the elements involved, and mix small batches. The dead mix is great for killing weeds in hard to trim places with no apparent ill effect on the surrounding area.

The 'Pre-Black' is used with the Parkerizing solution to 'set' it. It creates a very soft coating, and great care must be taken not to touch it moving the frame from 'Pre-black' to parkerizing tank . It is necessary to have the frame completely oil free before dipping it into the solution. This will be very obvious in the stock block and sight plate areas that are welded in place. it is a good idea to be sure that all oils, including finger oils are removed from these component parts of the frame before welding them in place. It is suggested that it be done with those cheap throw away latex gloves sold for model makers, or the 'surgical' gloves used by doctors. The "cooking" stage of the finishing is also best done in these or some kind of rubber protective gloves. One element of the solution is Hydrochloric Acid (Muratic Acid), found at garden and swimming pool supply houses everwhere in gallon jugs. Keep it away from aluminum and direct contact with your skin. Like battery acid, this compound contains sulfuric acid in a light concentrate that will, nonetheless, after a period of time still go to work on a variety of different finishes. All spills should be wiped up immediately with preferably, discardable paper towels. Working on something like a kitchen table, a large plastic garbage bag can be cut to cover the table and taped in place. Builder's "Vis Queen" works even better, because it is thicker. Do not get your hands in this stuff and wipe your eyes! Any compound accidentally splashed on bare skin must be washed off *immediately* !

***NEVER* ATTEMPT TO PARKERIZE IN AN ALUMINUM**

CONTAINER ! USE ONLY STAINLESS STEEL OR CERAMIC !

The solutions can be safely kept in plastic jugs. Just be certain there are no holes in them. Just treat them both like they were battery acid. To mix them, you just follow the included instructions. The suppiers are listed in the back of the book under 'Metal finishes'.

The last method is a baked on, high tech, tough, durable finish made basically of teflon. It is not, contrary to gun service advertisers claims, difficult to use, but it isn't real cheap. On the other hand, one pint will do about five to six guns the size of the M11/9. The only real bad news is that is will smell up the house for a few hours . . .

For those unfamiliar with this compound, remember when the Brazilian FALs were making their entrance into the American gun market? A lot of folks were put off by the slick black finish, as it reminded them of the cheap painted finishes common to the war era British mititary guns like the Enfields and the STENs. American military collectors like the flat sparkle of parkerized finishes. However, there is no comparison. Brazil and all of the surrounding nations are in a tropical environment, and it was for these countries, not America, the guns were made to be sold. Rusting is a very big concern is these nations. Ask any Vietnam vet about tropical weather. There is a good reason that the M-16 bolt carrier was chrome plated and the receiver was an aluminum alloy. Those FALs were first zinc phosphate finished, and then coated with this baked on teflon finish.

In a conversation with an old mercenary who carried one of these guns in some African area for some time, he revealed that even the cuts scratched into the surface by barbed wire did not rust noticeably, and that it was difficult to cut the baked on finish. Though some discussion was raised about coating the bore, conversation with professional platers pretty much concludes that it is both useless and dangerous. When a bore is plated with hard chrome such as the 'Armaloy' process, it is only five ten-thousandths to one thousandth of an inch thick. The baked on teflon, on the other hand is ten to fifteen thousandths

thick. The compound can be thinned and cleaned up with MEK solution, making a *little* thinner, but not much.

The process is simple: Just devise a hanger assembly from a metal coat hanger, and hang it from the kitchen oven rack in it's topmost positon with plenty of clearance around it. Put the oven on low (about 225-250 degrees) and leave it about one half hour. Mix the compound meanwhile, and set up your choice of spray gun. An old cardboard box works nice with a broomstick sized hole in each side. If the hanger is fashioned so that the original hanging hook of the hanger remains as is, the prepared frame can be brought out and quickly sprayed just like painting, as that is what is being done. The entire rack *can* be removed from the oven and placed on top of the box, the frame sprayed, and it replaced for finishing in the oven. The rack can be cleaned up or not, the baked on finish will not harm food. The teflon finish in cookware is very similar, though it is not suggested that this product is food grade.

Satisfied with the sprayed finish, the frame is returned to the oven and the temperature is turned up to 350-375 degrees, and the frame is left to cook for one to one and a half hours. At the end of this time, it is removed and hung in a safe place to air cool. The resulting finish will be hard, tough, and durable. It may be necessary to clean the compound from inside the holes in the frame. But, *under no circumstances* finish the frame with the trigger group parts in it ! The compound is available as 'Gun Coat' from KG Industries, whose address and phone appear in the Supplier's list in the back under "Metal Finishing Supplies".

The combinations here are endless. One individual first parkerized the gun, barrel and all, and baked a teflon coating on, on top of which he painted, using stencils, to create a camoflage design. The story goes that he was so successful, he lost the gun in the woods and not being able to find it, had to retrieve it with a metal detector!

A variety of professional plating services are offered. With these, the builder must use his or her own discretion. No home applications are being offered in this book but those here

covered. If you must be "The man with the *Golden Gun* , you're on your own!

Your comments are most welcome as you build. Bold individuals are invited to send pictures of their work. We may also be reached with recorded comment at the advertised 800 number, or by using the keyword 'With a gun', in the America Online System 'E-mail'. Our FAX number is 1-210-544-1754.

"And we thank you for flying Ironwulf !"

SUPPLIER NAME	SUPPLIER ADDRESS	PHONE
GUN PARTS:		
SHOTGUN NEWS	**P.O. BOX 669**	**800-345-6923**
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(PARTS AND KITS)	**COPPERHILL, TENN. 37317**	**615-496-1900**
M12 30 Mag:#	**TECHNICAL ASSISTANCE:**	**(CUSTOMER SERVICE)**
	JIM NUTTING	**FAX 615-496-3622**
RPB	**P.O. BOX 367**	**404-297-0907**
(PARTS AND KITS)	**AVONDALE ESTATES, GA. 30002**	**FAX 404-297-0917**
[RPB majors in AK & SKS parts as well as M11/9 and MAC kits**]**	**TECHNICAL ASSISTANCE: RUSSELL WEEKS**	
R & R Distributing	**2064 Briarcliff Rd St 107**	**404-897-1627**
(Division of Component	**Atlanta, Ga. 30329**	**800-550-4267**
Metal Products)	**32 Rnd - $30.00 $5.00 ship**	**FAX 404-636-7952**
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DELTA PRESS	**P.O. BOX 1625**	**800-852-4445**
	215 S. WASHINGTON ST.	**501-862-4984**
	EL DORADO, AZ. 71731	**FAX 501-862-9671**
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(MAGS AND BARREL STK.)	**CORRECT TOTAL ADDRESS)**	**FAX 914-679-5849**
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ALPHA TRADING COMPANY	**6131-B CARNEGIE DR.**	**501-771-4405**
(MAGAZINES)	**SHERWOOD, ARK. 72117**	**FAX 501-834-7199**
SOG INTERNATIONAL, INC.	**100 MECHANIC ST.**	**800-944-4867**
(MAGS AND DEALER GUNS)	**P.O. BOX 590**	**FAX 513-932-8928**
(SPEC. 30 RND M12/380)	**LEBANON, OHIO 45036-0590**	

$34.95 + $3.50 ship **[**At this time of finishing, SOG and Federal Arms Corp. have contracted for all of the CMP mags for the MK 11/9. They will resell these $30.00 magazines at $59.95 ea. Thank you Bill Clinton ! **]**

FEDERAL ARMS CORPORATION	**7928 University Ave.**	**612-780-8780**
	Fridley, Minn. 55432	
KY IMPORTS	**P.O. BOX 22446**	**502-244-4400**
(MAGS AND DEALER GUNS)	**LOUISVILLE, KY. 40252**	**FAX 502-244-0577**
(SPEC. 30 RND M12/380)		
COBRAY	**P.O. Box 813218**	**706-632-2468**

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Rutland Tool & Supply Co. Inc.
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